Accounting and Business Research

A ranking of accounting research output in the European region

A bridge too far: a common conceptual framework for commercial and public benefit entities

Earnings management within Europe: the effects of member state audit environment, audit firm quality and international capital markets

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(36)

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Contents

Articles		
A ranking of accounting research output in the European region	Kam C. Chan Carl R. Chen Louis T.W. Cheng	3
A bridge too far: a common conceptual framework for commercial and public benefit entities	Sheila Ellwood Sue Newbury	19
Earnings management within Europe: the effects of member state audit environment, audit firm quality and international capital markets	Steven J. Maijoor Ann Vanstraelen	33
Book Reviews		
Stephen Morrow. *The Business of Football: Image Management in Narrative Communication*	Mike Jones	53
Donna L. Street. *Inside G4 + 1: The working group's role in the evolution of the International Accounting Standard setting process*	Christopher Nobes	53
Notices		56

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36

Forthcoming Articles

p28775

Vivien Beattie and Alan Goodacre, A new method for ranking academic journals in accounting and finance

Gnanakumar Visvanathan, An empirical investigation of 'closeness to cash' as a determinant of earnings response coefficients

Edward Lee, Konstantinos Stathopoulos and Mark Hon, Investigating the return predictability of changes in corporate borrowing

Tony van Zijl and Geoffrey Whittington, Deprival value and fair value: a reinterpretation and a reconciliation

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A ranking of accounting research output in the European region

Kam C. Chan, Carl R. Chen and Louis T.W. Cheng*

Abstract—This study provides a ranking in accounting research output in Europe during 1991–2002. We use a set of 19 accounting journals to rank accounting programmes for 253 European universities. UK universities are overwhelmingly represented in the top ranking. Over the entire period, the top three universities are the University of Manchester, London School of Economics and the University of Edinburgh. Some leading European accounting programmes made good progress in research output during the 12-year period. The distribution of publication is highly skewed. The top-5, top-10, and top-25 universities account for 21%, 30%, and 54% of the total weighted number of articles, respectively.

1. Introduction

Ranking of academic research output is a subject of clear interest to many. Internal academic constituents such as faculty and administrators use rankings to guide programme assessment and resource allocation. Research rankings and publication records are also used as a basis for merit awards to individuals.[1] External constituents such as funding agencies, potential students, and faculty applicants, use rankings in various decision-making.

The School of Accounting of the University of New South Wales in Australia advertises its research ranking and that of two faculty members on the first page of its website. The Faculty of Economics and Commerce of the University of Melbourne also reports on the first page of its website the research ranking of its marketing department and faculty members. Hong Kong University of Science and Technology advertises its highly-ranked graduate business programme in *Business Week* (Asian Edition).

Some European governments have begun to step up higher education investment and have established criteria for resource allocation. Increased higher education investment highlights the need to evaluate such investment in education. The relative rankings of academic programmes in the European region would be an important benchmark. The UK government is an example. It conducts research assessment exercises (RAEs) in order to determine government research funding for academic institutions (Brinn et al., 1996). The *Financial Times* has widely publicised its rankings of MBA programmes globally. Its rankings, however, neither measure individual business disciplines nor focus on European-based programmes.

Additional motivation of this paper is related to two unique characteristics of the accounting discipline. First, in some aspects, accounting practice is a relatively localised discipline. The practice is strongly affected by local regulation, the maturity of local economic development and business culture of the society. Second, accounting has a long tradition of having a close relationship between academic units and practising professionals. With the emphasis of obtaining local professional qualifications, accounting curricula are closely integrated with the practice. Naturally, the accounting academics maintain a close relationship with the industry. Such a tight cooperation between academics and practitioners would have an effect on the research interest and consequently the research output of accounting from the local universities. Summing up these two factors, we conjecture that, due to the diversified business culture, regulatory regimes and different economic maturity of countries within the European region, the emphasis and the output of accounting research may also vary among European countries. In short, it is an important empirical issue to understand the diversity and progress in accounting research among various

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[1] Universities such as Euromed Marseille Ecole de Management, Marseille, award monetary bonuses on the basis of quality and quantity of publications. Certain universities in Asian countries (e.g., Taiwan) do the same.

European countries.

In this study, we first examine accounting research output of European accounting programmes, using a set of 19 leading accounting journals from 1991 to 2002. Similar to other studies, we use primarily weighted numbers of published articles as the measurement metric with the numbers of co-authors and co-affiliations as weights. Second, with 12 years of publication data, we provide some longitudinal comparisons as to how a specific university has improved in research output or not.

We document several interesting findings. First, UK institutions represent the majority of the top-25 among the 253 universities ranked. During the entire sampling period from 1991 through 2002, the top five universities are the University of Manchester, London School of Economics, the University of Edinburgh, Cardiff University, and the University of Dundee. Second, some leading European accounting programmes made good progress during the 12-year period as suggested by an increase in published accounting articles. Non-UK universities showed impressive improvement in research output, while UK universities' research output is holding ground. Third, consistent with other studies in economics, marketing and finance, the distribution of publication is highly skewed. The top-5, top-10, and top-25 universities account for 21%, 30%, and 54% of the total weighted number of articles, respectively.

2. Literature review

There have been a number of studies on research output, ranking of programmes and journal quality in various business disciplines including economics. Some examples include Malouin and Outreville (1987), Conroy et al., (1995), Scott and Mitias (1996), and Collins et al., (2000) in economics; Niemi (1988) and Bakir et al., (2000) in marketing; Niemi (1987), Alexander and Mabry (1994), Borokhovich et al., (1995), and Chan et al., (2002) in finance; Hasselback and Reinstein (1995), Brown (1996), and Stammerjohan and Hall (2002) in accounting. Stammerjohan and Hall (2002) rank 80 US universities by their abilities in placing doctoral graduates at top-tier programmes. The statistics reported provide insights on the 'output quality' (i.e., placement performance) of these universities.

More specifically, in the economics area, Conroy et al. (1995) examine the relative research output of economics departments in universities in the US. They focus on eight top economic journals using weighting adjustments on professional standing and journals' impacts to rank the departments. Malouin and Outrerille (1987) compare rankings of journals based on perception of economists. Using a set of 40 journals, Malouin and Outrerille show that differences of ranking perception exist, depending on the origin of countries and languages (English and French) of the journals and the economists being surveyed.

Scott and Mitias (1996) conduct a ranking exercise of economics departments based on 36 and top-5 economics journals. They also control for numbers of pages published, per capita output, and research concentration within the department. Their findings show that the rankings were stable for the top-20 departments but the rankings experienced substantial changes through time for departments ranked outside the top-20. Collins et al. (2000) evaluate the publication patterns in a set of 36 economics journals for graduates of 50 economics PhD programmes from 1987 to 1992. They show that the output is highly concentrated among the top programmes' graduates.

In the finance area, Alexander and Mabry (1994) use the citation frequency from 1987 to 1991 in top-4 journals to rank the top-50 finance journals and 50 most frequently cited authors. Borokhovich et al. (1995) study the differences in finance research output for 661 institutions from 1989 to 1993. They find evidence that prestigious business schools are associated with stronger research orientation. Chan et al. (2002) rank 923 finance programmes on a global scale using publication data in a set of 16 core finance journals from 1990 to 2001. They also study the factors that affect labour mobility in the academia.

In accounting, Hasselback and Reinstein (1995) study the publication records of 716 US institutions in 40 accounting journals from 1967 to 1991. The findings indicate that over 37% of the faculty members employed during the 1991–1992 academic year had no publications in any of the journals at all. In addition, after adjusting for co-authorship, journal weightings and per-capita output, small private institutions earned the highest rankings. Brown (1996) identifies influential accounting articles and then uses these data to rank researchers and institutions. The study provides a list of 26 classic accounting articles, which meet the requirement of being cited at least four times per year. While these studies are interesting, they are usually confined to US and Canadian institutions.

European-focused studies of research ranking and output are rather limited. They are either not in accounting or confined to a small subset of European countries. Kirman and Dahl (1994); Elliott et al., (1998); and Kalaitzidakis et al., (1999) study economics programme rankings in Europe. These studies follow the traditional studies of economics by using a set of good-quality economics journals and take total research output as the ranking criterion. Chan et al. (2004) examine finance research output in Europe on the basis of more than 6,000 articles in a set of 15 leading finance journals over 1990–1999. They find that the European universities have made considerable progress in research over the past decades.

The European-focus literature, with respect to accounting rankings, is confined to a single country or to general publication pattern issues. Carmona et al. (1999) analyse representation of different European countries (rather than European universities) in accounting research in 13 accounting journals over 1992–1997. They focus more on the role of the *European Accounting Review* and the European Accounting Association in dissemination of European accounting research, not on specific contributions at university levels. Other UK accounting-related studies include Gray et al., (1987) and Cottingham and Hussey (2000), who provide rankings of UK accounting programmes. Beattie and Goodacre (2004) report several general conclusions regarding UK accounting and finance programmes using data in 1998–1999. They observe the modest growth of the accounting and finance academic community, a doubling of the number of PhD-qualified staff and a reduction in the number of staff with a professional qualification. Beattie (2005) examines the UK researchers' contribution to financial accounting research, specifically in the areas of disclosure process and corporate social reporting. Beattie concludes that a significant amount of UK research adopts a more qualitative approach and case-based method. In short, our study is one of the first to provide comprehensive information on the progress of accounting research for universities in the European region.

3. Data and methodology

We collect the data from the hard copies of 19 leading accounting journals over a 12-year sample period from 1991 to 2002, recording authors' names and their affiliations.[2] The 19 accounting journals selected are: *Abacus*; *Accounting, Auditing, and Accountability Journal*; *Accounting and Business Research*; *Accounting, Organizations and Society*; *Accounting Review*; *Auditing: A Journal of Practice and Theory*; *Behavioral Research in Accounting*; *British Accounting Review*; *Contemporary Accounting Research*; *European Accounting Review*; *Journal of Accounting, Auditing, and Finance*; *Journal of Accounting and Economics*; *Journal of Accounting Literature*; *Journal of Accounting and Public Policy*; *Journal of Accounting Research*; *Journal of Business Finance and Accounting*; *Journal of Management Accounting Research*; *Management Accounting Research*; and *Review of Accounting Studies*.

We recognise that no matter what method we use to construct the final journal list, subjective opinion played a crucial role in the whole decision process. Nevertheless, an appropriate set of journals should help us to achieve the research objective effectively, which is to measure the accounting research output in the European region with little or no bias.

In our view, the most critical bias we want to minimise is to avoid selecting journals that are not regarded as an appropriate outlet by the European researchers. To better reflect the accounting research output for researchers from European institutions, we should adopt a journal list, which is relevant to the European region. In other words, journals focusing on topics requiring knowledge on non-European accounting regulations or practice should be avoided. In addition, sufficient coverage should be given to European-based journals and journals that have an interest in publishing European accounting research issues.

Having these criteria in our mind, we compile a set of journals meeting these requirements. Of course, the usual factors such as quality of the journals and resources limitation impose additional boundaries in our selection process. Our thinking process is as follows.[3] In order to base our journal selection on a recently developed research framework, we start with the journal list provided in Hasselback et al., (2003) and select journals that have a quality rating of at least 1.00. Twenty-seven out of 40 journals listed in Hasselback et al. make the first cut. Next, we exclude a total of 12 journals from these 27 based on the concept of relevancy mentioned above.

We eliminate *Journal of Taxation* despite its high quality rating because a number of its author affiliations are missing. We also do not include journals that primarily publish articles other than accounting topics although they are highly ranked in Hasselback et al. Examples include *Journal of Finance*, *Journal of Financial Economics* and *Management Science*. We further eliminate two US tax journals as they are too US-specific and not particularly relevant to European accounting practice. This leads to a set of 15 journals.

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[2] Some jointly authored articles may be credited to a recent graduate student publishing in collaboration with his/her faculty member in the graduate programme. The current affiliation would be with a new institution, while the work was mostly done at the graduate programme of his/her degree granting university. In this case, the degree granting institution does not receive any recognition. We thank a referee for raising this issue.

[3] Note that due to our language ability, we have no choice but to focus on only English language journals. We recognise the significant body of good-quality accounting research published in German, French, and Spanish language journals, but. non-English language journals are beyond our research. The dominance of the UK among European institutions may also be attributable at least to the English language bias. The UK may be the leader in research publications among all European countries, but not by as great a margin as indicated in our results. We thank a referee for pointing this out.

Then, four additional European (including UK) and Australian journals are added because of their relevance for the European region: *British Accounting Review*; *European Accounting Review*; *Accounting, Auditing and Accountability Journal*; and *Management Accounting Research*.[4]

Consequently, 19 accounting journals are used in this study. Eleven of the accounting journals come from the US/Canada region and eight from European/Australia region (UK = 5; Australia = 2; Denmark = 1). We believe that such a combination should minimise the US bias in evaluating research output of European universities and academicians. Rankings re-computed using only the eight non-North American journals are in Appendix 1.

Except for the *Review of Accounting Studies* and *European Accounting Review*, which began publishing in 1996 and 1992, respectively, all journals included in the study have been published for at least 12 years. We use this criterion so that we can measure the longer-term effort by European universities and their progress over time. We include *Review of Accounting Studies* because the journal is considered to have a significant influence on the accounting literature and *European Accounting Review* because it is a major outlet for European authors. These 19 journals cover both a range of professional interests (e.g., *Auditing: A Journal of Practice and Theory*, *Management Accounting Research*, and *Behavioral Research in Accounting*) and accounting in general (e.g., *Accounting Review*). In short, under resources constraint, we made our best effort to select a set of journals, which can properly reflect the output of European accounting researchers.

We note two caveats with respect to the data in our study. First, there may be non-accounting faculty members who contribute to the accounting research. While accounting faculty are the authors of a large proportion of the articles published in these journals, authors from other disciplines such as finance and economics can also write accounting articles. It is difficult, however, to distinguish specific author disciplines as a number of journals do not report authors' department affiliations. It would be cost-prohibitive to extract accounting versus non-accounting authors. Thus, the ranking results may overstate the performance of certain accounting departments, although research published by other disciplines within the same university also contributes to the general reputation of an accounting programme. The possible bias should be negligible.

Second, some journals (*Journal of Accounting, Auditing, and Finance*, and *Journal of Business Finance and Accounting*) also publish non-accounting papers as well. For *Journal of Accounting, Auditing, and Finance*, the majority of these papers are on accounting topics.

For *Journal of Business Finance and Accounting*, there are a considerable number of finance articles. We examine all the articles and exclude any that are not accounting-related. We acknowledge the subjective judgment in the selection process but we try to be as scientific as possible. If articles address a topic commonly pursued by both accounting and finance researchers, we classify them as accounting articles. Only papers with a strong finance nature and with little or no accounting interest (e.g., investment returns distribution during the financial crisis, or an alternative approach to options pricing) are classified as finance and thus excluded. Articles to be included can be accounting only, or accounting- and finance-related. In other words, in addition to the traditional accounting topics such as tax, auditing, financial statements, accounting standards, earnings, and dividend research, we include articles in corporate governance, information disclosure, and cash flow as accounting topics as well. For papers whose orientation is not obvious, we request a second opinion and require that two of us come to a consensus in classifying the paper. During 1991–2002, there were 732 articles published in *Journal of Business Finance and Accounting*, of which we classify 268 as accounting articles.

Similar to Chan et al., (2004) and other studies, we made some adjustments to the publication data. First, for multi-authored papers, we attribute the author (institution) contribution by 1/N, where N is the number of authors (institutions). Second, for authors with more than one affiliation, publication credit is equally shared among institutions. For example, if an article has two co-authors (Professors X and Y) and the first author has two affiliations (A and B) and the second author one (C), institutions A and B each receive 25% credit for the article and institution C receives 50% credit. Based on these adjustments, we are able to compute the number of weighted articles published by individuals, by institutions, and by countries.

Third, we carefully examine the collected data for errors. In a few cases, some authors or some institutions use slightly different names over the sample period. We make such corrections if neces-

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[4] These four additional European (including UK) and Australian journals were added on the recommendation of an external European/Australian journal expert. We then check this list with Table 4A of Brinn et al., (1996), we find that *Journal of International Financial Management and Accounting*; *Financial Accountability and Management*; and *Business History* are not in our study. Since Brinn et al. is published in 1996, and our external expert opinion is obtained just recently, we feel that, due to limited resources, the choice of our external expert is adopted in our final decision.

Table 1
Summary statistics of research output by country based on publications in 19 major accounting journals for the period of 1991–2002

This Table provides summary statistics of accounting research output by various European countries. N is number of universities in a country contributing to accounting research. To avoid distorting the mean, we do not report countries with two or less universities (Cyprus, Poland, Czech Republic, Lithuania, Portugal, Russia, Slovenia, Serbia and Montenego, Estonia, Hungary, and Latvia). However, their publications are included in the 'All non-UK schools'.

		Weighted number of articles			*Unweighted number of articles*		
Country	*N*	*Total*	*Mean*	*Standard deviation*	*Total*	*Mean*	*Standard deviation*
UK	90	812.53	9.03	12.82	1471	16.34	23.46
Denmark	5	31.60	6.32	7.89	57	11.40	13.39
Finland	10	49.30	4.93	4.58	89	8.90	8.72
Ireland	7	25.41	3.63	2.26	44	6.29	3.55
Netherlands	12	42.12	3.51	2.67	77	6.42	5.09
Norway	4	13.36	3.34	5.00	21	5.25	7.23
Belgium	7	22.68	3.24	3.43	53	7.57	7.63
Greece	3	8.01	2.67	2.91	15	5.00	3.61
Sweden	11	27.17	2.47	2.33	40	3.64	3.32
Germany	24	43.44	1.81	2.02	69	2.88	3.71
Spain	21	36.33	1.73	2.05	79	3.76	4.54
Austria	6	9.24	1.54	1.72	13	2.17	2.40
France	21	32.13	1.53	1.81	54	2.57	3.14
Switzerland	6	7.98	1.33	1.22	11	1.83	1.17
Italy	8	8.80	1.10	0.50	14	1.75	0.89
Turkey	3	1.14	0.38	0.22	3	1.00	0.00
All non-UK schools	163	386.81	2.37	2.96	689	4.23	5.37
All US and Canada	395	2642.55	6.69	10.59	5333	13.50	21.22

sary. An example is the Cardiff Business School and Cardiff University. They represent the same institution but the name changed in the mid-1990s.

For the period of 1991–2002 overall, the 19 accounting journals published 4,569 weighted articles by 3,747 authors from 962 academic and non-academic institutions worldwide.[5] Of these contributions, 253 universities from the European region account for 1,199.14 weighted articles (26.25% of the total number of articles).

4. Rankings of accounting research output

4.1. Rankings of research output, 1991–2002

Table 1 presents the overall research output by country and by weighted and total (unweighted) number of articles. Since most articles are co-authored, the weighted numbers are much smaller than the unweighted ones. The UK institutions dominate the rankings in terms of weighted number of articles. UK institutions publish 812.53 weighted numbers of articles, which is about 68% of the total European publication records. The UK represents 36% of the total European institutions, far less than its share of the publications (68%).

In terms of mean research output per institution by country, the UK again leads the pack with a 9.03 weighted number of articles. Denmark and Finland are in second and third positions with 6.32 and 4.93 average weighted numbers of articles.[6] Substantial variations in publications among universities within a particular country are observed. The UK has the highest standard deviation of 12.82 in weighted number of articles, followed by Denmark with 7.89.

Summary statistics for all non-UK institutions are presented at the end of Table 1. All the non-UK institutions, as a group, publish a total of 386.31 weighted articles. The mean of 2.37 weighted articles is below the 9.03 articles for the UK. While a finding of research dominance for the UK institutions is consistent with results reported elsewhere such as Nobes (1985) and Carmona et al., (1999), the non-UK universities do make contributions to

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[5] We do not include 'discussions', 'comments', and 'replies'. Weighted articles are adjusted for co-authorship, as described above.

[6] To avoid distorting the mean, we present results only for countries with at least three universities.

Table 2
The progress of research output by UK and non-UK institutions

This Table reports yearly weighted and unweighted research output from 1991 to 2002 by UK and non-UK institutions.

	Non-UK institutions			*UK institutions*		
Year	*No. of institutions*	*Weighted articles*	*Unweighted articles*	*No. of institutions*	*Weighted articles*	*Unweighted articles*
1991	8	8.67	15	34	64.25	115
1992	16	14.00	24	39	79.35	134
1993	32	36.54	56	40	72.33	129
1994	23	21.17	33	33	58.25	113
1995	33	27.75	50	42	63.67	115
1996	33	32.04	57	45	72.90	139
1997	43	38.99	65	39	63.85	107
1998	35	39.67	72	39	78.42	143
1999	39	42.33	81	38	66.38	112
2000	40	41.53	72	43	70.38	134
2001	46	44.67	86	34	58.17	113
2002	39	39.25	79	44	64.58	117
Total		386.61	690		812.53	1,471

the accounting literature, and the contribution has increased in more recent years.[7]

Table 2 reports the progress of non-UK research output vis-à-vis that of UK institutions. The significant progress made by non-UK institutions can be seen from the small number of publications in 1991 (8.67 weighted articles), and the significant contribution in the early 2000s (averaged about 42 weighted articles). On the other hand, UK's progress is stagnant. In 2002 UK institutions' research output was almost at the same level as in 1991.

The significant increase of publication by non-UK universities may be the result of a gradual globalisation of the labour market for business scholars. Two decades ago, there was a significant salary gap between accounting faculty members in North America and in the rest of the world. In the past 10 to 15 years, business faculty salaries, especially in accounting and finance, have risen substantially in some countries in the Asia-Pacific region (e.g., Hong Kong, Singapore, and Australia) and in Europe (e.g., UK, Germany, and France). With the improved financial compensation and research support provided in these countries, non-UK European universities should be in a better position to attract and retain well-trained accounting academicians who can publish in high quality English language journals.

Table 3 shows the top-25 universities in terms of weighted number of articles during the 12-year period of 1991 to 2002. Appendix 2 covers the 26th to 100th ranked universities. The University of Manchester and London School of Economics take the first and second positions. The University of Edinburgh, Cardiff University, and the University of Dundee round out the top-5. Consistent with statistics reported in Table 1, the UK's dominance is overwhelming: 21 of 25. The last column of Table 3 also reports department per capita weighted numbers of articles. We do not use this statistic to rank accounting programmes; but rather for additional information.

We rank institutions based solely on the weighted numbers of articles for several reasons. First, the reputation of an academic institution is often measured in terms of aggregate research output. A 20-person department that produces 15 *Accounting Review* articles yearly would be certainly perceived as a more influential institution than a one-person department that produces one *Accounting Review* article yearly, despite the latter's higher per capita output.

Second, there may be severe measurement problems in estimating per capita research output as data on department size are not available over the entire sample period. Our per capita figures are

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[7] To evaluate the impact of the four European journals on our results, we re-do the analysis using the 15 journals based on Hasselback et al. (2003). We find that the output from the 15-journal list for the European universities has declined some what. Only 11 of the original 16 countries remain in the list in Table1, suggesting that five countries (Norway, Greece, Austria, France, and Turkey) publish mostly in European-based journals. These tables are available to the readers upon request.

Table 3
Ranking of European universities by weighted number of articles in 19 leading accounting journals

This Table provides a ranking of European universities by weighted articles in 19 accounting journals during the period of 1991–2002. The weights are by co-authorship and co-affiliation. The numbers of unweighted articles as well as the country of the universities are also presented.

Rank	*Institutions*	*Country*	*Weighted number of articles*	*Unweighted number of articles*	*Number of staff*	*Per capita weighted number of articles*
1	U Manchester	UK	63.65	129	28	2.27
2	London School Economics	UK	55.58	78	23	2.42
3	U Edinburgh	UK	50.42	78	9	5.60
4	Cardiff U	UK	47.25	99	21	2.25
5	U Dundee	UK	31.72	70	8	3.96
6	Lancaster U	UK	31.50	56	13	2.42
7	U Glasgow	UK	29.53	52	15	1.97
8	U Essex	UK	27.90	49	11	2.54
9	U Exeter	UK	24.67	44	11	2.24
10	U Warwick	UK	23.25	39	17	1.37
11	U Manchester Institute Science and Technology	UK	23.23	46	3	7.74
12	U Sheffield	UK	22.82	49	12	1.90
13	U Strathclyde	UK	20.78	43	10	2.08
14	U Cambridge	UK	20.67	30	4	5.17
15	Copenhagen Business School	Denmark	20.25	35	5	4.05
16	U Wales-Aberystwyth	UK	18.25	34	10	1.83
17	U Reading	UK	18.17	24	5	3.63
18	U Stirling	UK	17.62	39	11	1.60
19	U Bristol	UK	17.17	26	7	2.45
20	U Leeds	UK	16.33	31	15	1.09
21	U Southampton	UK	14.83	24	8	1.85
22	U Cyprus	Cyprus	12.92	22	2	6.46
23	U Nottingham	UK	11.83	17	16	0.74
24	U Vaasa	Finland	11.75	21	10	1.18
25	Helsinki School Economics	Finland	11.33	23	24	0.47

based on department size as of 31 January 2004, as reported on websites of the institutions.[8] It would be practically impossible to get reliable information regarding faculty size for all 12 years for all institutions.

While Table 3 shows the dominance of the UK institutions in the top-25 list, one might argue that results from inclusion of British national journals such as the *British Accounting Review* (*BAR*) presumably favour British authors.[9] To address this issue, we re-rank the European institutions excluding *BAR*, and find this does not affect the dominance of the UK institutions; 20 of the 21 UK institutions listed in Table 3 remain in the top-25 list without the *BAR*. The University of Nottingham is replaced by the Norwegian School of Economics and Business Administration.

We also conduct correlation tests based on samples with and without *BAR*. Excluding *BAR*, we rank 244 universities. We then calculate the correlation coefficients of weighted and unweighted number of articles with and without *BAR* among the 244 universities. The Pearson correlation coefficients are 0.9908 and 0.9901 for weighted and unweighted numbers of articles. Hence, the inclusion of *British Accounting Review* does not create a bias in favour of the British institutions.

What about the impact of North American-based

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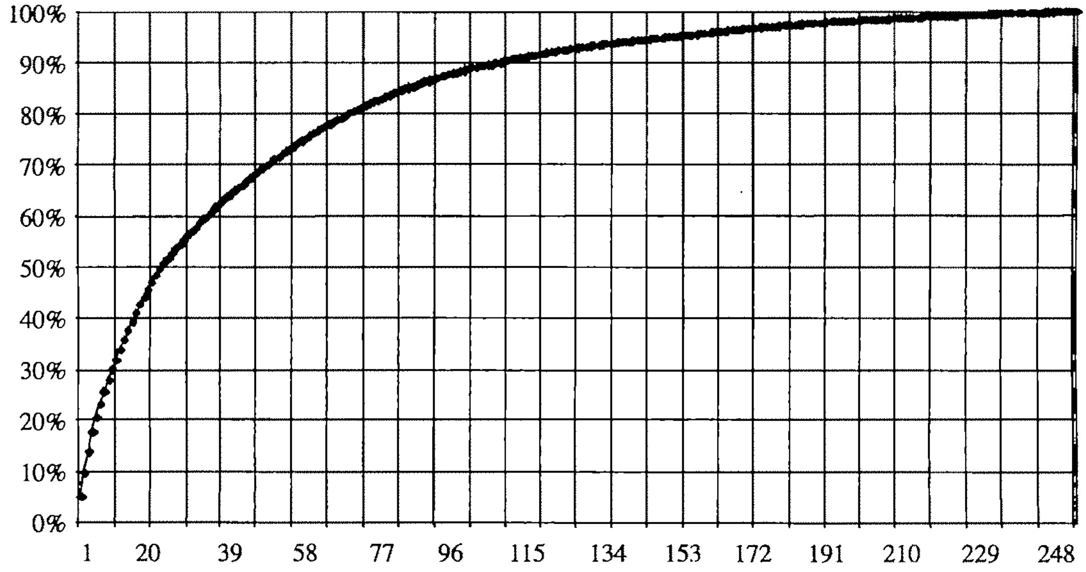
[8] As our staff numbers used may include researchers in finance if it is a joint department, the per capita figures actually are downwardly biased for departments that have finance staff. The bias is more severe for departments having a high percentage in the finance area.

[9] Indeed, 60.27% of the BAR authors are UK researchers. US, non-UK European, and Asian authors account for 8.83%, 4.64%, and 26.27% of the weighted number of articles, respectively. On the other hand, 61.4% and 28.49% of the weighted number of articles in the *European Accounting Review* are authored by non-UK European and UK authors, respectively.

Figure 1
Cumulative percentage of weighted number of articles for 253 universities in European region (1991–2002)



accounting journals? To provide robust results, we also examine our rankings using only the eight non-North American accounting journals in our sample. The results are in Appendix 1. Comparing Table 3 with Appendix 1, the rankings are similar. In fact, for the top-21 accounting programmes, they are almost identical, with only small changes in relative ranking. Oxford University and Turku School of Economics and Business Administration replace the University of Cyprus and Helsinki School of Economics among the top-25 accounting programmes. Contrary to the general belief that North American journals favour UK authors, non-UK institutions actually published more articles in the North American journals than UK institutions. Not reported in the paper, we find that non-*UK institutions* publish 33.03 weighted articles in North American journals, while the same statistic is only 22.91 for UK institutions.

Figure 1 shows the percentage distribution of the weighted articles of all 253 European universities that published at least one (unweighted) article in the 19 accounting journals. It plots the cumulative percentage of the weighted articles against the cumulative number of European universities (arranged from higher rank to lower rank). The distribution is highly skewed. For instance, the top-5, top-10, and top-25 universities account for high percentages (about 21%, 30%, and 54%, respectively) of all weighted articles published. The skewness suggests an increasing marginal effort to move up in rankings. For example, looking at Table 3 and Appendix 2, it will take the University of Liverpool in the UK 2.20 additional weighted articles to move 25 places from 100th to 75th. To move equal places from 50th to 25th, however, it will take an addition of 4.63 weighted articles.

4.2. Ranking changes during subperiods (1991–1996 vs. 1997–2002)

To evaluate the research progress of the leading European universities on a longitudinal basis, we conduct a comparative analysis of research performance for the first subperiod (1991–1996) and the second subperiod (1997–2002). Table 4 presents the results.

Thirteen of the top-25 universities (52%) show an increase in research output in terms of weighted articles (in Column (9)). It is also interesting to see that 12 universities have declining research output.

Columns 5 and 8 report rankings for the two subperiods. The University of Manchester remains in the leading position in the second subperiod. In Column (11), we provide the relative ranking changes over the two subperiods (i.e., Column (5)

Table 4
Research output progress of top 25 European universities: 1991–1996 to 1997–2002

This Table compares the research output progress of the top-25 European universities from 1991–96 to 1997–2002. Percentage increase (+) or decrease (–) of weighted number of articles and unweighted number of articles are presented.

		1991–1996			*1997–2002*			*Changes*		
Rank (1)	*University* (2)	*Weighted articles* (3)	*Unweighted articles* (4)	*Rank* (5)	*Weighted articles* (6)	*Unweighted articles* (7)	*Rank* (8)	*Weighted articles* (9)	*Unweighted articles* (10)	*Weighted rankings* (11)
1	U Manchester	32.72	70	1	30.93	59	1	–1.78	–11	0
2	London School Economics	32.42	44	2	23.17	34	4	–9.25	–10	–2
3	U Edinburgh	20.83	34	3	29.58	44	2	8.75	10	1
4	Cardiff U	19.17	37	6	28.08	62	3	8.92	25	3
5	U Dundee	20.48	47	4	11.23	23	13	–9.25	–24	–9
6	Lancaster U	14.67	24	8	16.83	32	6	2.17	8	2
7	U Glasgow	11.37	22	13	18.17	30	5	6.80	8	8
8	U Essex	13.03	22	10	14.87	27	7	1.83	5	3
9	U Exeter	12.42	24	11	12.25	20	10	–0.17	–4	1
10	U Warwick	11.00	21	14	12.25	18	11	1.25	–3	3
11	U Manchester Institute Science and Technology	19.73	37	5	3.50	9	53	–16.23	–28	–48
12	U Sheffield	13.62	31	9	9.20	18	16	–4.42	–13	–7
13	U Strathclyde	15.28	32	7	5.50	11	34	–9.78	–21	–27
14	U Cambridge	9.00	14	17	11.67	16	12	2.67	2	5
15	Copenhagen Business School	6.42	10	23	13.83	25	8	7.42	15	15
16	U Wales-Aberystwyth	9.17	19	16	9.08	15	17	–0.08	–4	–1
17	U Reading	11.00	13	15	7.17	11	23	–3.83	–2	–8
18	U Stirling	6.87	13	20	10.75	26	14	3.88	13	6
19	U Bristol	6.67	8	21	10.50	18	15	3.83	10	6
20	U Leeds	11.83	23	12	4.50	8	41	–7.33	–15	–29
21	U Southampton	8.00	13	18	6.83	11	25	–1.17	–2	–7
22	U Cyprus	0.00	0	n.a.	12.92	22	9	12.92	22	n.a.
23	U Nottingham	4.83	8	29	7.00	9	24	2.17	1	5
24	U Vaasa	5.42	9	27	6.33	12	29	0.92	3	–2
25	Helsinki School Economics	6.33	13	24	5.00	10	36	–1.33	–3	–12

Table 5
Top-25 authors in European universities in terms of weighted total number of articles (1991–2002)

This Table gives the top-25 authors in European universities by weighted number of articles in 19 accounting journals in 1991–2002. Rankings are based on number of weighted articles published with total number of articles as the tie-breaker. Weights are co-authorship and co-affiliation. The numbers of unweighted articles as well as the country of the universities are also presented. The affiliations of the authors are from their last affiliations in the database.

Panel A: 1991–2002

Rank	*Author*	*Affiliation*	*Weighted articles*	*Unweighted articles*
1	Nobes, Christopher	U Reading	14.83	20
2	Walker, Stephen P	U Edinburgh	9.00	11
3	Llewellyn, Sue	U Edinburgh	9.00	10
4	Jones, Michael John	Cardiff U	8.83	15
5	Parker, Robert H	U Exeter	8.50	11
6	Vafeas, Nikos	U Cyprus	8.50	10
7	Otley, David T	Lancaster U	8.17	13
8	Power, Michael K	London School Economics	8.00	9
9	Scapens, Robert W	U Manchester	7.95	16
10	Edwards, John Richard	Cardiff U	7.83	17
11	Whittington, Geoffrey	U Cambridge	7.50	12
12	Lapsley, Irvine	U Edinburgh	7.50	10
13	Gray, Rob	U Glasgow	6.78	12
14	Peasnell, Kenneth V	Lancaster U	6.67	12
15	Humphrey, Christopher	U Manchester	6.50	14
16	Bhimani, Alnoor	London School Economics	6.50	7
17	Walker, Martin	U Manchester	6.25	13
18	Robson, Keith	U Manchester Institute Science and Technology	6.20	11
19	Beattie, Vivien A	U Stirling	6.12	14
20	Stark, Andrew W	U Manchester	6.00	9
21 (tied)	Napier, Christopher J	U Southampton	6.00	8
21 (tied)	Walton, Peter J	ESSEC	6.00	8
23 (tied)	Bryer, RA	U Warwick	6.00	6
23 (tied)	Hopwood, Anthony G	Oxford U	6.00	6
23 (tied)	Klumpes, Paul JM	U Warwick	6.00	6

Panel B: 1991–1996

Rank	*Author*	*Affiliation*	*Weighted articles*	*Unweighted articles*
1	Nobes, Christopher	U Reading	8.00	10
2	Power, Michael K	London School Economics	6.00	7
3	Scapens, Robert W	U Manchester	5.78	11
4	Robson, Keith	U Manchester Institute Science and Technology	5.03	8
5	Whittington, Geoffrey	U Cambridge	5.00	8
6 (tied)	Napier, Christopher J	U Southampton	4.50	6
6 (tied)	Parker, Robert H	U Exeter	4.50	6
8	Llewellyn, Sue	U Edinburgh	4.50	5
9	Edwards, John Richard	Cardiff U	4.33	8
10	Clubb, Colin DB	U London	4.25	6
11	Humphrey, Christopher	U Manchester	4.17	9
12 (tied)	Jones, Michael John	Cardiff U	4.00	5
12 (tied)	Walker, Stephen P	U Edinburgh	4.00	5
14 (tied)	Bryer, RA	U Warwick	4.00	4
14 (tied)	Hulle, Karel van	Catholic U Leuven	4.00	4

Table 5 (continued)
Top-25 authors in European universities in terms of weighted total number of articles (1991–2002)

Panel B: 1991–1996 (continued)

Rank	*Author*	*Affiliation*	*Weighted articles*	*Unweighted articles*
16	Otley, David T	Lancaster U	3.83	7
17 (tied)	Cooke, Terry E	U Exeter	3.83	5
17 (tied)	O'Hanlon, John	Lancaster U	3.83	5
19 (tied)	Walton, Peter J	ESSEC	3.67	5
19 (tied)	Peasnell, Kenneth V	Lancaster U	3.67	5
21	Gietzmann, Miles B	London School Economics	3.50	5
22 (tied)	Bhimani, Alnoor	London School Economics	3.50	4
22 (tied)	Citron, David B	Cass Business School	3.50	4
22 (tied)	Sangster, Alan	Queen's U-Belfast	3.50	4
25	Gray, Rob	U Glasgow	3.42	6

Panel C: 1997–2002

Rank	*Author*	*Affiliation*	*Weighted articles*	*Unweighted articles*
1	Vafeas, Nikos	U Cyprus	8.50	10
2	Nobes, Christopher	U Reading	6.83	10
3	Walker, Stephen P	U Edinburgh	5.00	6
4	Klumpes, Paul JM	U Warwick	5.00	5
5	Jones, Michael John	Cardiff U	4.83	10
6	Lapsley, Irvine	U Edinburgh	4.50	6
7	Llewellyn, Sue	U Edinburgh	4.50	5
8	Otley, David T	Lancaster U	4.33	6
9 (tied)	Stark, Andrew W	U Manchester	4.17	6
9 (tied)	Jacobs, Kerry	U Edinburgh	4.17	6
10 (tied)	Mouritsen, Jan	Copenhagen Business School	4.00	7
10 (tied)	Walker, Martin	U Manchester	4.00	7
13 (tied)	Bjornenak, Trond	Agder U College	4.00	5
13 (tied)	Parker, Robert H	U Exeter	4.00	5
15 (tied)	Barker, Richard G	U Cambridge	4.00	4
15 (tied)	Hussain, Simon	U Newcastle-upon-Tyne	4.00	4
15 (tied)	Toms, JS	U Nottingham	4.00	4
18 (tied)	Beattie, Vivien A	U Stirling	3.92	9
18 (tied)	Charitou, Andreas	U Cyprus	3.83	6
20	Edwards, John Richard	Cardiff U	3.50	9
21	Lukka, Kari	Turku School Economics and Business Administration	3.50	6
22	Ahrens, Thomas	London School Economics	3.50	5
23 (tied)	Brennan, Niamh	U College Dublin	3.50	4
23 (tied)	Frantz, Pascal	London School Economics	3.50	4
23 (tied)	Malmi, Teemu	Helsinki School Economics and Business Administration	3.50	4

– Column (8)). A positive number of ranking changes show that a university is advancing compared to its peers during 1997–2002 period. Cardiff University is ranked 6th in the first subperiod and moves to the 3rd in the second subperiod. The University of Glasgow advances from the 14th rank to the 5th. Several non-UK universities also advance in the second subperiod. For instance, Copenhagen Business School moved from 23rd to 8th. Among the universities that have declining research output, the University of Manchester Institute of Science and Technology drops from the 5th place in the first subperiod to 53rd in the second subperiod. The University of Strathclyde and the University of Leeds also experience significant decrease in ranks.

If we compare the number of articles (both weighted and un-weighted) published by the top-10 institutions (all UK schools) during the two sub-periods (Table 4), we find that the quantity of output for the top-10 as a group has not shown a significant increase. In addition, the yearly statistics in Table 2 indicate that the output of non-UK institutions has increased but the output of UK schools pretty much remains at the same level through the years. These evidence, therefore, suggest that the competition between UK and non-UK European institutions has become more intense and the non-UK group is catching up fast.

Table 5 reports the top-25 individual authors for the period and subperiods in terms of weighted total number of articles. In Panel A for the entire period, the University of Manchester and the University of Edinburgh each account for three spots among the top-25 authors. The top-5 authors are Christopher Nobes, Stephen Walker, Sue Llewellyn, Michael John Jones, and Robert Parker. All the authors in Panel A are from UK universities.

Panels B and C present similar rankings for the periods of 1991–1996 and 1997–2002. A noticeable difference is the appearance of several non-UK authors; in Panel C, there are six non-UK top authors, while there are only three in Panel B. The results in Table 5 are consistent with those in Table 4, suggesting that non-UK universities are making good progress in their accounting output in more recent years.

5. Conclusion

Accounting is a relatively localised discipline with a strong linkage between practitioners and academics. It is logical to expect that European countries with different economic development and business culture put different emphasis on accounting research. Our objective is to provide a scientific indicator of accounting research output for various European countries. Such findings are important for various constituents to better gauge the diversity and progress made in accounting research during the recent period.

There are a few limitations in our study. These limitations include using journals in English only, difficulties in selecting an appropriate list of journals and potential problems in identifying accounting articles in accounting journals also publishing manuscripts from other fields. Nevertheless, extensive measures and procedures have been used to minimise any biases due to these limitations.

Our comprehensive ranking of European accounting research using publication data from 19 accounting journals over a 12-year period from1991 to 2002 indicates that a few well-known universities with long traditions are ranked behind some younger universities in the top-25. The University of Manchester leads all universities in terms of accounting research output over the period, followed by London School of Economics, the University of Edinburgh, Cardiff University, and the University of Dundee. Although the UK universities produce the greatest share of research output, other European institutions show more significant progress than UK institutions. As a group, non-UK universities exhibited a 15% annual increasing rate in research output over the 12-year period, while UK institutions are holding their ground. Longitudinal data reveal that 13 or 52% of the top-25 European universities have made significant progress in producing accounting research from 1991 through 2002.

Appendix 1
European universities ranked from 1 to 25 in research output among eight non-North American accounting journals

This Table provides a ranking of European universities from eight non-North American accounting journals in 1991–2002. The journals are: *Abacus*; *Accounting, Auditing, and Accountability Journal*; *Accounting and Business Research*; *Accounting, Organizations and Society*; *British Accounting Review*; *European Accounting Review*; *Journal of Business Finance and Accounting* (accounting articles only); and *Management Accounting Research*. Rankings are based on number of weighted articles published with total number of articles as the tie-breaker. The weights are by co-authorship and co-affiliation.

Rank	*University*	*Country*	*Weighted articles*	*Unweighted articles*	*Rank in Table 2 and Appendix 2*
1	U Manchester	UK	61.48	124	1
2	London School Economics	UK	54.42	75	2
3	U Edinburgh	UK	50.42	78	3
4	Cardiff U	UK	45.25	95	4
5	U Dundee	UK	31.72	70	5
6	Lancaster U	UK	29.50	52	6
7	U Glasgow	UK	28.53	51	7
8	U Essex	UK	27.40	48	8
9	U Exeter	UK	23.67	42	9
10	U Manchester Institute Science and Technology	UK	23.23	46	11
11	U Sheffield	UK	22.82	49	12
12	U Warwick	UK	21.25	37	10
13	U Strathclyde	UK	20.78	43	13
14	U Cambridge	UK	20.67	30	14
15	Copenhagen Business School	Denmark	20.08	34	15
16	U Reading	UK	18.17	24	17
17	U Wales-Aberystwyth	UK	18.00	33	16
18	U Stirling	UK	17.12	38	18
19	U Leeds	UK	16.33	31	20
20	U Bristol	UK	15.00	22	19
21	U Southampton	UK	14.33	23	21
22	U Nottingham	UK	11.83	17	23
23	U Vaasa	Finland	11.75	21	24
24	Oxford U	UK	10.67	16	27
25	Turku School Economics and Business Administration	Finland	10.33	19	29

Appendix 2
European universities that are ranked from 26 to 100 in research output

This Table provides a ranking of European universities from 19 accounting journals in 1991–2002. Rankings are based on number of weighted articles published with total number of articles as the tie-breaker. The weights are by co-authorship and co-affiliation.

Rank	*University*	*Country*	*Weighted articles*	*Unweighted articles*
26	Norwegian School Economics and Business Administration	Norway	10.75	16
27	Oxford U	UK	10.67	16
28	U London	UK	10.40	22
29	Turku School Economics and Business Administration	Finland	10.33	19
30	Catholic U Leuven	Belgium	9.50	20
31	U West England	UK	9.37	20
32	U Newcastle-upon-Tyne	UK	9.17	14

Appendix 2 (continued)
European universities that are ranked from 26 to 100 in research output

Rank	*University*	*Country*	*Weighted articles*	*Unweighted articles*
33	Cass Business School	UK	8.83	14
34	U Aberdeen	UK	8.83	12
35	U Wales-Bangor	UK	8.67	15
36	Johann Wolfgang Goethe-U	Germany	8.33	14
37	Open U	UK	8.25	11
38	U Birmingham	UK	7.83	15
39	U Bath	UK	7.67	13
40	U East Anglia	UK	7.67	12
41	Loughborough U	UK	7.67	11
42	Sheffield Hallam U	UK	7.60	16
43	U Groningen	Germany	7.58	15
44	U Maastricht	Netherlands	7.54	17
45	Stockholm School Economics	Sweden	7.50	8
46	U Carlos III de Madrid	Spain	7.37	17
47	U Bradford	UK	7.37	16
48	Heriot-Watt U-Edinburgh	UK	7.12	18
49	U Hull	UK	6.75	11
50	U Antwerp	Belgium	6.67	17
51	Erasmus U Rotterdam	Netherlands	6.53	9
52	London Business School	UK	6.33	11
53	HEC	France	6.33	10
54	U College Dublin	Ireland	6.33	9
55	U Limburg-Maastricht	Netherlands	6.25	14
56	Vrije U Amsterdam	Netherlands	6.17	8
57	U Portsmouth	UK	6.00	15
58	Dublin City U	Ireland	6.00	11
59	Athens U Economics and Business Administration	Greece	6.00	9
60	Aston U	UK	5.97	12
61	U York	UK	5.50	6
62	INSEAD	France	5.36	12
63	Stockholm U	Sweden	5.33	11
64	U Ulster	UK	5.33	8
65	Queen's U-Belfast	Ireland	5.00	9
66 (tied)	U Amsterdam	Netherlands	5.00	7
66 (tied)	U Graz	Austria	5.00	7
68	Helsinki School Economics and Business Administration	Finland	5.00	6
69	U Zaragoza	Spain	4.90	12
70	U de Valencia-Spain	Spain	4.83	8
71 (tied)	U Gothenburg	Sweden	4.50	6
71 (tied)	U Jyvaskyla	Finland	4.50	6
73	U Paris-Dauphine	France	4.50	5
74	U Valencia	Spain	4.25	7
75	Glasgow Caledonian U	UK	4.20	10
76	Odense U	Denmark	4.00	8
77	U Plymouth	UK	4.00	4
78	U Pompeu Fabra	Spain	3.92	6
79	U Southern Denmark	Denmark	3.50	7
80 (tied)	ESC	France	3.50	6
80 (tied)	National U Ireland	Ireland	3.50	6
80 (tied)	U Paisley	UK	3.50	6
83	U Lodz	Poland	3.50	5
84	U Geneva	Switzerland	3.50	4
85	Thames Valley U	UK	3.42	8
86	Tilburg U	Netherlands	3.42	6

Appendix 2 (continued)
European universities that are ranked from 26 to 100 in research output

Rank	*University*	*Country*	*Weighted articles*	*Unweighted articles*
87	U Tampere	Finland	3.25	8
88	Middlesex U	UK	3.25	7
89	U Aarhus	Denmark	3.17	5
90	U Augsburg	Germany	3.00	5
91	U College-Cork	Ireland	2.83	5
92	Eindhoven U Technology	Netherlands	2.75	6
93	U East London	UK	2.70	6
94	Napier U-Edinburgh	UK	2.67	6
95	U Huddersfield	UK	2.67	6
96 (tied)	Royal Institute Technology-Stockholm	Sweden	2.50	3
96 (tied)	U Zurich	Germany	2.50	3
98	U Pablo de Olavide de Sevilla	Spain	2.33	10
99	ESSEC	France	2.33	3
100	U Liverpool	UK	2.00	4

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A bridge too far: a common conceptual framework for commercial and public benefit entities

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Abstract—Writers and standard setters have propounded the adoption of private sector frameworks for the public sector. Ellwood (2003) examined the apparent 'bridge' between and across the sectors provided by UK GAAP and concluded that much work needed to be undertaken on the theoretical underpinning of Whole of Government Accounts, but WGA is progressing presuming the commercial model. There has been recent debate in the Antipodes as to whether conceptual frameworks can be common for the private and the public and not-for-profit sectors or whether such claimed commonality is a sham (Newberry, 2002). In the UK, the Accounting Standards Board (ASB) has produced a reinterpretation of the Statement of Principles for public benefit entities. This paper investigates the proposed Statement of Principles for public benefit entities (SoPpbe). There appears to be an inherent unsuitability of the current private sector framework for transference to 'public benefit entities'. The balance sheet focus and the assumed objective of wealth creation are incomprehensible in a public or not-for-profit context. Changes in public service management embodied within New Public Management (NPM) led to the ascendancy of accruals accounting but this does not necessarily permit the adoption of a (reinterpreted) private sector conceptual framework. It is concluded that the differences are so fundamental that it is misleading to claim the adoption of a common bridging framework and it is misguided to struggle to achieve one. The differences will always make such an endeavour 'a bridge too far'.

1. Introduction

The adoption of private sector financial frameworks has been argued to be appropriate for public sector entities (Likierman, 1998; McGregor, 1999) and some countries e.g. Australia and New Zealand have adopted one conceptual framework across the sectors. In the UK, the ASB issued a draft interpretation of its Statement of Principles on Financial Reporting for 'public benefit entities' in 2003 followed by an Exposure Draft in 2005.

Accounting standards developed for profit-orientated entities have been applied in public sector entities in the UK for several years (Ellwood, 2002) and the International Federation of Accountants (IFAC) is currently adapting IASs for the public sector. However, Ellwood (2003:119) criticised the diversity of approach and the lack of a clear underpinning framework in the UK public sector.

> 'UK GAAP may provide the basis for a bridge across the public sector (and between the public and private sector) but the public sector perspective needs to be firmly incorporated and definitions and principles reworked to provide an appropriate conceptual framework for the diverse UK public sector.'

Nevertheless, Whole of Government Accounts (WGA) is progressing before the underlying conceptual framework has been thoroughly addressed. We take a UK perspective and examine whether the reinterpreted commercial SoP, the Statement of Principles for public benefit entities (SoPpbe) provides an appropriate bridge.

The UK Accounting Standards Board (ASB) appears to take the view that a transaction is a transaction and it should be accounted for in the same way by all types of organisations. This view asserts that the nature of assets, liabilities, revenues and expenses, gains and losses does not change because they are held by the public, instead of by the private, sector. The ASB proposes using basically the same accounting rules and reporting model for a business ('the commercial model') and non-profit-making bodies or to use the ASB's nomenclature public benefit entities (PBEs).

We argue that public sector entities are different from businesses. Business accounting standard-etters do not consider the specific nature and role of public service organisations. Business firms do not levy taxes or provide goods freely to customers. The accounting rules for public service organisations and their reporting model should be different from those of commercial firms. There are no immutable accounting or financial-reporting rules

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that apply irrespective of the nature and purpose of the organisation whose activities and results are being displayed, or regardless of the objectives of presentation.

The paper has three main sections. The first section considers a conceptual framework and its role in underpinning accounting. The UK's Statement of Principles (SoP) and its re-expression for public benefit entities (SoPpbe) are introduced and the main changes highlighted. The main body of the paper considers the distinctiveness of the public sector and the implications for an accounting framework. The objective, context and accountability of PBEs are different from the private sector. The final section discusses the implications of such apparent mismatches and argues that to strive for such extensive commonality is heroic but 'a bridge too far'. Commercial management approaches have been adopted in the public sector and accrual accounting has thrived, but public sector entities have distinctive characteristics. PBEs acquire resources to expend them in a legal and appropriate manner for the public benefit not to increase or even maintain capital. Resource allocation cannot be left to the market forces of supply and demand, but rather statutory, fund and budgetary controls apply. Public sector accountability is based on the proper and efficient use of resources (stewardship). The reporting framework of PBEs cannot be merely a re-expression of one devised for commercial bodies that assumes the objective of wealth creation and has a balance sheet focus.

2. Conceptual frameworks and the re-expressed Statement of Principles

Conceptual frameworks in the physical sciences are based on real world observable phenomena that delineate the function of the structure in question. Thus conceptual frameworks emerge as a mixture of experience and observation. To some extent early attempts to construct a theory of accounting used an inductive approach (Hendricksen, 1982:1) the practices of accountants were observed to try and distinguish a consistent pattern. However, using this approach discernable explanatory statements were difficult to establish and could not be directed at improving accounting practice. From the 1950s onwards a more normative approach has developed. Numerous standard-setting bodies emerged throughout the world and sought to construct a conceptual framework to underpin accounting standards and to provide guidance to practitioners in areas where no accounting standards exist. In the UK the Accounting Standards Steering Committee, a predecessor of the Accounting Standards Board (ASB), issued a discussion document in 1975 – The Corporate Report – but the most ambitious attempt to create a conceptual framework was undertaken by the Financial Accounting Standards Board (FASB) in the US. The FASB conceptual framework was largely adopted by the International Accounting Standards Committee, now the International Accounting Standards Board (IASB).

The FASB (1978:2) defines a conceptual framework for accounting as:

> 'A constitution, a coherent system of interrelated objectives and fundamentals that can lead to consistent standards and that prescribes the nature, function and limits of financial accounting and financial statements.'

The UK Accounting Standards Board (ASB, 1996) has emphasised this role and stressed how a conceptual framework or 'statement of principles' could underpin accounting standards and practice.

> 'A statement of principles is designed to provide a coherent frame of reference, including a set of definitions to be used by the Board....during the course of the standard setting process. Having an interrelated set of fundamental principles should ensure consistency in the Board's standards and minimise the need to reinvent fundamental concepts in the course of every project.'

Dopuch and Sunder (1980) purport that conceptual frameworks cannot usefully be related to the accounting standards themselves in a direct way: the frameworks attempt to add legitimacy to the policy making process but the relationship of specific accounting standards to the frameworks will be vague or fluid. Legitimacy is one of the multiple purposes that Page and Spira (1999) entertainingly suggest conceptual frameworks serve and several writers (Booth, 2003; Dean and Clarke, 2003; Loftus, 2003) draw out the inconsistencies within the frameworks. Jones (1992) points out how the norm is for accounting standards to be developed before their associated conceptual framework. Nevertheless, standard-setters around the world feel the need to produce such documents. Dopuch and Sunder (1980:18) argue the FASB needs a conceptual framework simply to boost its public standing and go on to hypothesise: 'the demand to develop a conceptual framework may be inversely related to the power of enforcement which the standard setting agency can command'. The ASB acknowledged in 1993 that the accounting requirements of public sector bodies are a matter for Government (ASB 1993 para. 21). However, in May 2003 the ASB issued its Discussion Paper on a Proposed Interpretation of the Statement of Principles for Public Benefit Entities, which was followed by a largely unchanged ED Statement in 2005. In the UK, the ASB is attempting to extend its influence into non profit organisations at a time when its direct influ-

P 28775

ence over commercial accounting is diminishing with the advent of harmonisation of accounting standards. The acceptance of a common or a reinterpreted commercial conceptual framework would provide 'legitimacy' not only for accounting standards in the public sector, but also for a greater role for the ASB in public sector accounting.

The Statement of Principles for Financial Reporting (the SoP) was published in 1999 and is very close to the International Accounting Standards Committee's (IASC's) framework (later adopted by the IASB). Both the UK SoP and the IASC's framework are confined to profit-orientated entities but are not restricted to the private sector. The IASC framework, paragraph 8 refers to 'all commercial, industrial and business reporting enterprises whether in the public or private sectors'. The purpose of commercial accountability is widely accepted as 'to provide information about a firm that is useful to a wide range of people making economic decisions' (IASB Framework). Useful information' is information on the financial position, performance and financial adaptability of an enterprise. This private sector perspective is contrasted with the public sector below.

Commercial accounting has made significant in roads into the public sector, The UK government is producing Whole of Government Accounts, broadly based on the commercial model without first considering whether that model provides an appropriate reference for public sector accountability.

2.1. The Statement of Principles for financial reporting: proposed interpretation for public benefit entities (SoPpbe)

The proposed interpretation issued in August 2005 (ASB, 2005:27) defines public benefit entities as:

> '...reporting entities whose primary objective is to provide goods or services for the general public or social benefit and where any risk capital has been provided with a view to supporting that primary objective rather than for a financial return to equity shareholders.'

Although the SoP (ASB, 1999) was intended for profit-orientated bodies, the ASB believes that a common set of principles should underlie financial reporting by all entities and has made minimal changes.

> 'Any re-expression, change of emphasis or additions to the principles are designed to make them more relevant to public benefit entities and have only been made to clarify their application in situations specific to public benefit entities.' (ASB, 2005:25)

The SoP covers many facets of accounting: the objectives of financial statements and their users; the reporting entity; the qualitative characteristics of financial statements; the elements and issues relating to recognition, measurement and presentation. The SoP broadly assumes an investor focus and an objective of wealth creation. The main elements are defined as: asset, liability, equity (of owners), income and expense. 'Income' includes revenue and gain; 'expense' includes loss. Asset is defined as resource controlled by a firm as a result of past events and from which economic benefits are expected to flow in future. Liability is defined as present obligation of a firm arising from past events, settlement of which is expected to result in a future outflow of resources. Other elements are defined in terms of these two, thus the SoP was described by Ernst & Young (1993) as having a balance sheet focus. The SoP and the re-expressions for PBEs are set out in Table 1.

The ASB's approach has led to few revisions to the SoP to permit its use for PBEs. Chapters 6 and 7 (Measurement in Financial Statements and Presentation of Financial Information) are largely unchanged. The most significant re-expressions relate to the objective and the elements of financial statements (Chapters 1 and 4 respectively).

3. The distinctiveness of public sector accounting

There are many unique public sector circumstances to which a conceptual framework for public sector reporting must relate. In democracies, governments are elected by citizens to provide a range of collective goods and services to citizens. Some of these collective goods and services can only sensibly be provided by government (legal system, defence) while other services can be regarded as merit and social welfare goods that cannot be left to market forces (health, education, pensions). The citizenry require accountability from the government – they must be kept informed and can exercise democratic control over the government. Thus, governments are distinct from private profit orientated bodies, they raise funds from taxation; provide public goods; have debt capacity limits unlike other entities and redistribute wealth through government grants. These issues have no parallels in commercial accounting but are fundamental aspects of government.

Public sector accounting and financial reporting has for millennia sought to protect and manage public money and discharge accountability. Aristotle in the Politics referred to the citizenry having a right to know how funds are used and that the accounts should be laid before them. In 13th century England the Magna Carta made clear that there should not be taxation without consent as to how those funds are used. In the US 200 years ago, Thomas Jefferson, as quoted by Arthur Andersen

Table 1
The re-expression of principles in the SoPpbe

Principle as expressed in SoP	*Principle as re-expressed SoPpbe*
Chapter 1 The objective of financial statements	
Objective can usually be met by focusing exclusively on the information needs of present and potential investors i.e. the defining class of user. – need information about the entity's financial performance and financial position that is useful to them in evaluating the entity's ability to generate cash (including the timing and certainty of its generation) and in assessing the entity's financial adaptability.	Objective can usually be met by focusing exclusively on the information needs of funders and financial supporters i.e. the defining class of user. – need information about the entity's financial performance and financial position that is useful to them in evaluating the proper and efficient use of the entity's resources and the entity's ability to generate cash and in assessing the entity's financial adaptability.
Chapter 2 The reporting entity	
	Separate financial information may be required for assets under an entity's stewardship but not control.
Chapter 3 The qualitative characteristics of financial information	
Information is relevant if it has the ability to influence the economic decisions of users and is provided in time to influence those decisions.	Information is relevant if it has the ability to influence the economic decisions of users, or their assessment of the effectiveness of the stewardship of management, and is provided in time to influence those decisions.
Information is material to the financial statements if its misstatement or omission might reasonably be expected to influence the economic decisions of users.	Information is material to the financial statements if its misstatement or omission might reasonably be expected to influence the economic decisions of users, or their assessment of the effectiveness of the stewardship of management.
Chapter 4 The elements of the financial statements	
Assets are rights or other access to economic benefits controlled by an entity as a result of past transactions or events.	Although the SoP notes 'future economic benefits eventually result in net cash inflows to the entity' this may not be the case for PBEs i.e. can embody service potential instead of cash flows.
Liabilities are obligations of an entity to transfer economic benefits as a result of past transactions or events.	'General commitments' do not create a liability Specific commitments – performance related grants – other
Ownership interest is the residual amount found by deducting all of the entity's liabilities from all of the entity's assets.	As in the SoP except:
Gains are increases in ownership interest not resulting from contributions from owners.	Residual interest substituted for ownership interest
Losses are decreases in ownership interest not resulting from distributions to owners.	Controlling parties substituted for owners
Contributions from owners are increases in ownership interest resulting from transfers from owners in their capacity as owners.	
Distributions to owners are decreases in ownership interest resulting from transfers to owners in their capacity as owners.	

Table 1 *(continued)*
The re-expression of principles in the SoPpbe

Principle as expressed in SoP	*Principle as re-expressed SoPpbe*
Chapter 5 Recognition in financial statements	
	In a transaction involving the receipt of resources not related directly to the provision of goods or services, the focus will be on whether an asset exists and whether or not it has led to a liability. As such, the recognition criteria are likely to be met on receipt of the resources.
Chapter 6 Measurement in financial statements	
	Mixed measurement but acknowledgement that measurement of the replacement cost of the service potential of an asset often more appropriate (contortion of value to the business).
Chapter 7 Presentation of financial information	
	Acknowledges different purpose but requires same statements as profit-orientated.
Chapter 8 Accounting for interests in other entities	
In single entity financial statements, interests in other entities are dealt with by focusing on the income and (depending on the measurement basis adopted) capital growth arising from those interests.	In single entity financial statements, interests in other entities are dealt with by focusing on the income and/or expenditure and (depending on the measurement basis adopted) capital growth arising from those interests.
Consolidated financial statements reflect the whole of the parent's investment in its subsidiaries, including purchased goodwill.	Consolidated financial statements reflect the whole of the parent's investment in its subsidiaries, including, where applicable, purchased goodwill. [Acquisition approach] Business combinations involving PBEs are often a 'gift' (do not involve consideration) therefore it might be appropriate to adopt an alternative presentation.

Source: Adapted from the ASB Consultation Document 2003 as modified by ED Statement 2005

(1986), wished to see 'the finance of the Union ...so that every member of Congress, and every man of any mind in the Union, should be able to comprehend them to investigate abuses, and consequently to control them'. Comparatively recently, the Governmental Accounting Standards Board (GASB) 1987 stated:

> 'Accountability is the cornerstone of all financial reporting in government... Governmental accountability is based on the belief that the citizenry has a 'right to know', a right to receive openly declared facts that may lead to public debate by the citizens and their elected representatives. Financial reporting plays a major role in fulfilling government's duty to be publicly accountable in a democratic society.'

Guthrie (1998: 5) refers to the

> '...fundamental principle that no public monies should be spent in ways and in amounts not specified in annual parliamentary appropriations.'

Chan (2003:13) argues that the rise of government accounting is due to the greater demand for accountability in a democracy.

> 'While all governments engage in some form of planning and control, only democratic governments are mandated to open their books – directly to auditors and indirectly to the public through financial reports.'

The term public benefit entity has been coined to cover both public sector and charitable bodies but

Table 2
Users of accounting statements

Non-Business Statements				*Business*
Anthony	Drebin et al	SoPpbe		SoP
1978	1981	2003	2005	1999
Governing bodies	Legislative bodies		Government and their agencies	Government and their agencies
Investors and creditors	Investors vendors	**Funders and financial supporters**	**Funders and financial supporters**	**Present and potential investors**
				Suppliers/ trade creditors
Resource providers	Grantors	Lenders	Lenders	Lenders
Oversight bodies	Oversight bodies			
Constituents	Voters	The public	The public	The public
Tax-payers				
Fee-paying recipients		Beneficiaries/ customers	Customers	
Employees			Employees	
Management				

Note: **bold type** denotes the primary class of user
Sources: Anthony (1978); Drebin et al (1981); ASB (1999; 2003 and 2005)

in this paper we place emphasis on the distinctiveness of the public sector. The charity sector comprises a vast and growing segment of economic activity. There were over 185,000 charities registered with the Charity Commission of England and Wales at the end of 2000, with an annual income of £24.6bn (Charity Commission, 2001). Similar to public sector bodies, charities do not have a primary profit motive and are characterised by a diversity of accounting practices (Conolly and Hyndman, 2004). However, Kearns (1994:186) has highlighted the vast differences between the public sector and the private non-profit sector in mission, philosophy, structure and standard setting procedures. In the US there are actually three different accounting standard setting bodies. The FASB sets the accounting standards for the private sector including charities. The GASB is responsible for setting accounting standards for the state and local governments and the Federal Accounting Standards Advisory Board (created in 1990) recommends accounting standards for federal government. Democratic accountability, tax raising powers and unparalleled debt capacity limits are unique to governmental bodies. We argue that public sector bodies are held to a higher standard of accountability and that accountability has a different perspective from that used for businesses and charities.

3.1. The users and objective of financial reporting

PBEs do not have profit as a primary aim and therefore by definition the objective of commercial or profit-orientated entities is different from PBEs. Chan (2003:14) claims government accounting has three purposes: its *basic* purpose is to safeguard the public treasury by preventing and detecting corruption and graft; the intermediate – to facilitate sound financial management; and the advanced purpose of government accounting is to discharge public accountability. Taking a wider perspective, accounting also provides input to budget policy formulation and decisions. However, the SoPpbe makes only modest changes to the original SoP (Table1) and merely revises the defining class of user from 'investors' to 'funders and providers' and adds an additional information need relating to 'the proper and efficient use of the entity's resources'. This excessively narrow view is investigated below.

There have been several studies examining the users of accounting statements of non business organisations. Twenty-five years earlier Anthony identified the objectives and users of accounting statements in non-business organisations and Drebin et al, (1981) in a research report 'Objectives of Accounting and Financial Reporting for Governmental Units' commissioned for the National Council on Governmental Accounting identified 10 user groups. These are contrasted with the SoP and the SoPpbe in Table 2.

Remarkably the SoPpbe (ASB, 2003 and 2005) provides a less inclusive set of users than the SoP. and merely argues for the substitution of 'funders and financial supporters' as the primary class of user in place of 'present and potential investors'.

> 'The defining class of user for the financial statements of public benefit entities is the funders and financial supporters. They provide a source of cash or other resources without the incentive of a return, either a direct return (like interest paid on a loan) or in the form of an exchange for direct benefits (goods or services) for themselves. The funder and financial supporter generally provides taxation, grants or donations to the entity. The defining class of user includes the present and potential funders and financial supporters of the entity.' (ASB, 2005 para. 1.13)

The SoPpbe appears to ignore democratic accountability, the 'cornerstone' of public sector accountability by merely replacing the investor by 'funder and financial supporter '(Table 1). Is accountability to individuals determined purely by whether they are taxpayers? Admittedly the term as explained covers present and potential 'funders and financial supporters' (though 'past' funders were excluded under revisions for the ED). Its application is therefore wide ranging but whether present and future finance is the locus of accountability is contentious. The 2005 ED included 'Government and their agencies, including regulators' as a separate category (Table 2). The ASB sees Government as performing a scrutiny role on behalf of funders and financial supporters, or the general public (ASB, 2005:33) but does not regard Government as the defining class of user. Tom Allen (2002:20), the Chairman of GASB, states GASB regards the primary users of state and local government reports to be those to whom government is primarily accountable: its citizens; those who represent citizens and those who finance government.

There is modest correlation between Anthony's objectives for non-business organisations and the ASB's perceived objectives of profit-orientated bodies – both are envisaged to require information on performance and financial viability but for profit-orientated bodies this is envisaged for economic decision-making whereas stewardship and the proper use of funds is paramount in non-business organisations. The SoPpbe recognises that stewardship is important and enshrined in public accountability (para. 1.5) but in effect this appears to be an add-on rather than taking 'paramount importance'.

Stewardship has traditionally had a greater prominence in commercial reporting. The Sandilands Committee (1975: 44) stated:

> '[A] traditional tenet of accounting that the main objective of published financial statements is to enable directors to give an account of their stewardship of the shareholders funds to the shareholders.'

Stewardship is fundamental to the nature and roles of government.

In the US, GASB's new reporting model, Statement 34, 'Basic Financial Statements – Management's Discussion and Analysis –for State and Local Governments' is expected to meet the nine financial reporting objectives identified in Concepts Statement 1 (Table 3).

The GASB reporting objectives fall into three broad categories. Financial reporting should:

- assist in fulfilling government's duty to be publicly accountable and should enable users to assess that accountability;
- assist users in evaluating the operating results of the governmental entity for the year;
- assist users assessing the level of services that can be provided by the governmental entity and its ability to meet its obligations as they become due.

That is not to say that accounting does not have a decision-making role in the public sector. The problem of scarce resources applies across the sectors (Rowles, 2004). Information systems in public service organisations should assist in cost control and asset and liability management at the ex post stage and in budget policy formulation and macroeconomic management at the ex ante stage.

However, the reporting objectives are much closer to the traditional stewardship role than those in the SoP. Acknowledging the importance of stewardship but merely substituting the term 'funders and financial supporters' for 'investors' does not take appropriate account of the differing nature of PBEs compared with profit-orientated bodies. Accountability for stewardship for public bodies is steeped in history and was accepted long before the advent of the joint stock company with the divorce between ownership and management in the commercial sector. The SoPpbe appears constrained by its minimal adaptation approach –the whole crux of a profit-orientated body is at odds with PBEs. Some users will sometimes be interested in the financial statements simply in order to assess the adequacy of stewardship exercised by

Table 3
GASB financial reporting objectives

Financial reporting should assist in fulfilling government's [illegible] to be publicly accountable and should enable users to assess that accountability.

a) Financial reporting should provide information to determine whether current year revenues were sufficient to pay for current year services.
b) Financial reporting should demonstrate whether resources were obtained and used in accordance with the entity's legally adopted budget: it should also demonstrate compliance with the finance-related legal or contractual requirements.
c) Financial reporting should provide information to assist users in assessing the service efforts, costs and accomplishments of the governmental entity.

Financial reporting should assist users in evaluating the operating results of the governmental entity for the year.

a) Financial reporting should provide information about sources and uses of financial resources.
b) Financial reporting should provide information about how the governmental entity financed its activities and met its cash requirements.
c) Financial reporting should provide information necessary to determine whether the entity's position improved or deteriorated as a result of the year's operations.

Financial reporting should assist users assessing the level of services that can be provided by the governmental entity and its ability to meet its obligations as they become due.

a) Financial reporting should provide information about the financial position and condition of a government entity.
b) Financial reporting should provide information about a government entity's physical and other non-financial resources having useful lives that extend beyond the current year, including information that can be used to assess the service potential of those resources.
c) Financial reporting should disclose legal or contractual restrictions on resources and risks of potential loss of resources.

the entity's management and not always to make economic decisions.

Indeed the SoPpbe (ASB, 2005) recognises in Chapter 2 (para. 2.17) that PBEs often have a stewardship role for assets that they do not control. For example patients' monies or art-work loaned for an exhibition. As a PBE does not control these assets they would not be consolidated but the SoPpbe acknowledges that the PBE 'may be required to prepare separate financial information relating to assets under stewardship but not control'.

Chapter 3 is also amended to take account of this additional (though not primary) stewardship role. Relevant and material information is extended to include information for 'the assessment of the effectiveness of the stewardship of management'.

3.2. The elements of financial statements

The SoPpbe makes modest changes in adapting the classifications and the definitions in Chapter 4 for PBEs (Table 1). The same headings are used except 'residual interest' is substituted for 'ownership interest' and 'controlling parties' is substituted for 'owners'.

However, the definitions are interpreted to often mean something quite different from their commercial sector counterparts. For example, an asset is defined in both the SoP and the SoPpbe as

> 'Assets are rights or other access to future economic benefits controlled by an entity as a result of past transactions or events.'

Several writers (Mautz, 1988; Pallot, 1990; Barton, 1999; Granoff, 1998; Ellwood, 2003) have clearly enunciated some of the peculiar characteristics of many community and heritage assets held by public sector bodies. However, the Board argued that no amendment to the definition of an asset is needed for PBEs, although some re-expression of the application of the definition is necessary. For PBEs, the future economic benefits that are embodied by an asset include the provision of goods or services to the benefit of the entity's beneficiaries, as well as the eventual inflow of cash to the entity. Thus the definition is the same but the meaning is quite different – it includes benefits that do not give rise to a cash flow and those that do not even flow to the entity itself.

Reinterpretation to make the private sector frameworks appear to fit gives the impression of convergence, but if it has to be interpreted differently then this is really pretence. Not surprisingly, attempts to apply the profit-orientated frameworks by merely reinterpreting existing definitions have been proclaimed 'a sham' (Newberry, 2002). While this debate continues, public-sector accounting is developing, and as Newberry (2001) argues the development is at odds with those proposing a 'sector neutral' conceptual framework. She argues that, despite the same conceptual definitions, the significant sector-specific differences in interpretation of those definitions mean that, effectively, there are two conceptual frameworks from which different accounting practices (Newberry, 2002) are derived.

Again, liabilities are defined for PBEs as in the SoP.

> 'Liabilities are obligations of an entity to transfer economic benefits as a result of past transactions or events.'

The SoPpbe introduces the notion of two types of 'commitments to provide public benefits' that can be created by public benefit entities. The nature of the commitment (i.e. whether it is general or specific) will determine whether a liability has been incurred. A general commitment includes political promises and does not create a liability until it has become specific (the recipient has met any relevant criteria and is able to rely on the entity fulfilling its promise). Public benefit entities can also enter into commercial contracts, which should be accounted for no differently from similar contracts entered into by profit-oriented entities.

To assess the firmness of a political commitment it would be necessary to look at the extent of political consensus behind it and future pressures (both political and economic). This is a minefield – is a manifesto promise a liability? (In the UK there have been changes to university top up fees, extension in age for female retirement and so on.) It would appear political commitments can change. This is a very difficult area and it is arguably going too far into subjectivity and for what purpose? It ignores the uniqueness of Government in enabling them to raise taxation in the future to ensure liabilities can be met as they fall due.

Ownership interest and control obviously differs between the commercial sector and PBEs. In the commercial sector, owners have a residual interest in the assets of the entity after all the liabilities have been deducted. For most public benefit entities the residual ownership interest represents resources that the entity retains for the provision of future benefits to the public. According to the SoPpbe, the residual interest is usually attributed to an entity's funders and financial supporters though the make up of these funders and supporters is unclear (electorate? taxpayers? or government?).

The treatment of gains and losses for profit orientated bodies according to the commercial SoP gives rise to serious concerns. There is no separate definition of revenue and expense, they are subsumed within gains and losses. The definitions are set out and re-phrased for PBEs in Table 1. The SoP uses the balance sheet as the focal point and defines gains and losses accordingly as increases and decreases in ownership interest ('controlling interest' is merely substituted in the SoPpbe).

The SoP appears to be at odds with some government accounting developments. In recent years public sector bodies in the UK have introduced measures to enable the cost of services to be measured more appropriately. Some operating statements such as those of central government departments include notional costs to provide comparative performance statements. These would not meet the SoP's definition of a loss/gain. Such notional costs are used to ensure that the financial statements report the full cost of the services they provide. For example, local government accounts are charged with a capital charge in respect of tangible fixed assets to reflect the opportunity cost of assets held. Notional charges do not result in changes in ownership interest. This is because notional charges debited in the statement of financial performance are, as part of the net total of this statement, subsequently also credited to reserves. There will be no increase/decrease in ownership interest, as the net balance on the statement of financial performance is taken to the reserves. Therefore, they do not meet the definition of a gain or loss, as no change in the ownership interest has occurred. However, for certain entities there may nevertheless be a requirement, set out by the Government, to include such costs with the statement of financial performance. These notional charges provide incentives for the efficient use of scarce resources that are not subject to market forces. They may be necessary for improved decision making in the public sector but in no way do they relate to wealth creation.

Control of public sector finance also impacts on government reporting. For example, the introduction of Resource Accounting and Budgeting (RAB) for UK central government accounting impacts on the presentation of public sector plans (HM Government, 1994). Heald and Georgiou (2000) point out that the government's need to control both the public expenditure planning process and the annual voting by Parliament of supply expenditure on a resource basis mean it is unlikely that the government would ever relinquish control over government reporting to an outside body. The ASB cannot presume its pronouncements will be followed, it must show its conceptual framework is appropriate to the unique circumstances of government.

The SoP has also been subject to heavy criticism in the commercial sector, most notably by Ernst&Young (1993:2)

> 'Accounts are to be constructed around rules aimed at 'getting the balance sheet right' ...This approach has a certain amount of intuitive appeal. Laymen tend to think of a balance sheet as a statement of a company's wealth, and on this basis it may seem sensible to measure profits and other gains by measuring the increase in that wealth. But we think it puts the cart before the horse. In our view the balance sheet does not and cannot properly reflect the worth of the company, whatever the measurement basis used. This is because the value of the company lies in its ability to generate future cash for its stakeholders, not in the individual values of its present assets and liabilities. We believe that the primary focus should be on the measurement of earnings, and that the balance sheet should be seen as a residual statement, derived from measuring the company's profits and not the other way round.'

This argument is much stronger when applied for PBEs. The public sector 'got the horse out of the stable' (introduced accrual accounting) in order to measure the consumption of resources appropriately. The cart (the balance sheet) is extremely difficult to assess with any degree of accuracy because of the nature of public sector assets and liabilities (what is the value of heritage assets such as Nelson's column or the pension liability of the UK government?) and to some extent irrelevant given the unique tax raising powers of government. Government assesses whether debt is sustainable based on its percentage of GDP, not the balance sheet gearing ratio. On the other hand, the comparative cost of public services is important in assessing the proper use and stewardship of public services.

During the 25 years since Anthony's seminal work *New Public Management* (*NPM*) has developed. *NPM* emphasises the introduction of private sector management techniques and the application or simulation of competitive market behaviour. Typical reforms include features such as:

- clearly defined outputs and goals;
- resource allocation linked to performance measurement;
- yardstick competition and benchmarking;
- greater flexibility in hiring and compensation;
- cost-cutting and labour discipline; and
- breaking up monolithic ministries into decentralised units or agencies centred on well-defined products or tasks.

More generally, *NPM* includes increased orientation on the private sector to provide public services and as a model for managing these services. Responsibilities are devolved and there is an increased emphasis on managerialism and giving managers the power and right to take an increasing range of decisions. There is a move from the state being a provider of services to purchasing these services from the private or voluntary sectors through out-sourcing, contracting or public private partnerships.

Nevertheless, underlying or natural differences between profit orientated bodies and the public sector remain. Governments provide social goods that often cannot be left to the market because of externalities or the consumption of goods is non-rival (Musgrave and Musgrave, 1989). The partaking of public benefits does not reduce the benefit available to others, for example, water fluoridation or defence expenditure.

Ellwood (2002: 584) shows how changes in UK public sector accounting in the 1990s were largely due to NPM reforms.

> '[They] provided the impetus for more commercial style accounting in health, local government and central government. The specific focus was largely in obtaining improved information on resources consumed and thus enabling comparisons between service providers within the public sector and with private sector providers. Accruals accounting enabled more reliable, 'full' costs to be derived and the private sector style of accounting fitted well with the Conservative government's commercial ethos.'

The IASC (1989) supported the FASB view that financial statements prepared on an accrual basis are more useful in making economic decisions. The Public Sector Committee of the IFAC (2000: 229) defines the accruals basis as:

> 'A basis of accounting under which transactions and other events are recognised when they occur (and not only when cash or its equivalent is received or paid). Therefore the transactions and events are recorded in the accounting records and recognised in the financial statements of the periods to which they relate.'

This requires the application of the matching principle not a balance sheet focus. The public sector developed accrual accounting to get the benefits in the operating statement through the better measurement of service costs not primarily for the debatable financial position shown in the balance sheet.

The benefits of accruals accounting as summarised by Evans (1995) are largely the better measurement of costs and revenues including comparison between years and with outside suppliers and a greater focus on outputs rather than inputs, together with improved information for asset and liability management. These benefits fit neatly with the reforms embedded in NPM but not with a SoP based on a balance sheet focus. The benefits of accrual accounting require the matching of expenditure to the outputs provided. The public sector appears to have realised the value of traditional commercial accounting at a time when the commercial sector was shifting the focus from traditional stewardship to investor decision-making. Paton and Littleton (1940) described two essential facets of financial reporting: (1) accounting should be based on price aggregates that result from bargained exchanges, and (2) income could be appropriately measured by recognising revenue when realised and matching incurred costs with those revenues. This second point is what is important in NPM and what is lost in the current move to 'comprehensive income'. The SoPpbe (2005:82) after reiterating paragraphs 5.28 and 5.29 on 'matching' from the original SoP explicitly states: 'This means that the Statement does not use the notion of matching as the main driver in the recognition process.'.

Chan (2005) categorises degrees of accrual accounting from mild accrual to radical accrual.

- mild accrual recognises current financial resources and current liabilities;
- moderate accrual recognises long term financial resources and long term liabilities in addition to current financial assets and current liabilities;
- strong accrual includes also capital resources and contingent liabilities; and
- radical accrual includes the present value of future revenues and social policy commitments in addition to current and long term liabilities.

In the private sector, accrual accounting refers to the recognition of revenue on the bases of goods and services rendered and the recognition of expenses for the assets used and liabilities incurred in generating revenue. On the other hand, the public goods characteristics of many government services make it difficult to recognise government revenues in this way. Chan (2005:6) argues that 'proposals to meet strong accruals would not meet the cost-benefit tests in developing countries.' But, we argue that in developed countries, the question of whether accounting using radical accruals provides additional cost-benefit has not been fully addressed.

The current commercial approach to focus on the balance sheet is giving rise to huge problems when attempting to apply the requisite recognition criteria in a public sector context. The problem with a common conceptual framework is manifest most in terms of its effect in the associated accounting standards. To recognise present obligations on child benefit, unemployment benefit and old age pensions would introduce huge liabilities. The problem of non-exchange revenue (non–reciprocal transactions) is equally daunting – should a balance sheet approach be applied to direct and indirect taxation, grants and donations. IFAC is presently grappling with such issues after having issued 20 IPSAS based on commercial accounting.

The IFAC (2004) issued proposals on reporting for 'Revenue from Non Exchange Transactions'. The proposals follow the private sector 'assets and liabilities' approach to revenue recognition. The IFAC proposals initially suggest the government should recognise tax revenues according to when 'the taxable event occurs' rather than when the tax is due to be paid. However, recognition criteria require that it is probable that the future economic benefit will flow to the entity; and the fair value can be measured reliably. Thus it is accepted that for government taxation, the recognition criteria are likely to be met when the resources are received. The resultant proposals appear similar to the approach adopted in the *Government Finance Statistics Manual* (IMF, 2001). The 'right' answer appears to have been contrived by contortions from the original SoP.

Similarly, in 'Accounting for social obligations' (IFAC, 2004) using the balance sheet approach for non-exchange transactions and thus identifying the point in time when an obligation arises is problematic, and as the ACCA (2004:5) has responded to the IFAC:

> '[T]he political obligation that a government has to provide future social services is fundamentally different from the legal obligation which an entity has to pay debts.'

Thus the balance sheet focus does not fit well with the unique problems of government reporting. National accounting (formerly national income accounting) produces statistics for the whole economy that attempt to measure the production of goods and services i.e. a concept of wealth creation. The government uses General Financial Statistics in its management of the economy, but financial reporting is entity-based and while broad reconciliations can be made at a macro level, GFS and financial reporting are necessarily derived from differing data sources.

As commercial accounting permeates further into public sector financial reporting, there is a danger of an 'unbalanced' balance sheet – one that acknowledges dubious liabilities but excludes valuable assets (such as the Crown Jewels) or tax raising powers. Barton (2004:281) has shown how nonsensical a commercial approach can be when applied to a government department.

> '[F]rom its financial statements the Australian

> Defence Forces appear to be the most profitable enterprise in the nation – their profits and dividends far exceed ...those of the largest private corporations.'

3.3. Measurement and presentation in accounting statements

The SoPpbe acknowledges in Chapter 6 that PBEs may provide goods and services free of charge or substantially below market rates. This inevitably causes problems in computing current value. In practice, UK public sector bodies are using a plethora of valuation bases (Ellwood, 2003) and though they claim to apply modified historic cost, Jones (1998) remarked how it has been 'modified out of all recognition' when compared with commercial bodies.

The SoPpbe recognises that further information is necessary in order for users to make a full assessment of the stewardship of PBEs. Similarly GASB acknowledges that basic financial statements will not meet its financial reporting objectives (Allen, 2002). Public sector bodies such as local authorities have traditionally provided more forward-looking information than commercial companies for example budgetary information. In the private sector management is held to account for profits and large salaries may be forgiven if returns are strong. In the public sector management is held accountable for the efficient and appropriate use of resources and this requires greater disclosure. In local government, electors can inspect the accounts and have access to the auditor.

Greater disclosure in particular would appear to be required on difficult issues such as social benefits. The public is concerned to know whether pensions or social benefit schemes are affordable and this is arguably much more important than including contentious figures in the balance sheet.

In Chapter 8 the SoPpbe is amended to include the combination of PBEs without consideration (i.e. 'a gift'), consequently goodwill may not be appropriate. The boundary of the reporting entry is considered to be the same as for profit-orientated bodies, but this ignores the sovereign power of government which surely leads to a locus of control that is much greater than private sector entities. However, as Heald and Georgio (2000) note, the Treasury will ensure that boundaries are compatible with Parliamentary requirements.

The eight chapters of the original SoP have been adapted with minimal changes in the reinterpretation (ASB, 2005). Whether such an approach is appropriate does not appear to have been adequately discussed.

4. Conclusions

Conceptual frameworks purport to provide a theoretical underpinning for financial reporting related to the objectives of financial accountability and user needs. Likierman (1998) argued that adapting the private sector framework for the public sector provides a 'read across' to the private sector and uses an established framework rather than reinventing the wheel. When a government owes money, it has a liability just as does a business. And, when it carries out operations using subsidiary organisations, then it includes those activities in its financial statements, just as a business does. Many accounting rules for recognising, quantifying, valuing and recording transactions and events are the same for government as they are for business. However, there are many unique public sector circumstances to which a conceptual framework must relate. Fundamental differences between the public sector and the commercial sector require the reporting framework to be designed specifically for the sector not a minimalist revision of a commercial framework. Democratic accountability, collective and welfare goods and services, tax-raising powers, debt capacity limits are crucial differences from the context of commercial firms. One underpinning conceptual framework cannot fit organisations with such fundamental differences. Furthermore is such comparability so important. Näsi (1999) observes:

> 'Comparability is, of course, a fine thing, but if the economic entities themselves cannot, in reality, be compared with each other or, at best, only to some slight extent, the application of the same accounting system will provide few, if any, blessings.'

Accruals accounting has advanced remarkably across the UK public sector and there have been many acknowledged benefits that are aligned with New Public Management. There is also considerable merit in drawing upon UK GAAP when introducing reporting standards for the public sector but the case for a radical accruals approach as is adopted in the commercial sector has not been fully investigated.

Conceptual frameworks add 'legitimacy' to accounting standards and enhance the standing of the standard setters. The reinterpretation of the UK SoPpbe (ASB, 2003 and 2005) is opportune at a time when the ASB's role is diminishing but we argue that it fails to give adequate attention to the requirements of public sector accountability and there is no assurance that government will follow it.

The objectives and users of public sector accounting statements are much wider than those presumed for profit orientated entities and certainly not focused on wealth creation. FASB rejected the popular matching-based concept of income and adopted the enhancement of wealth concept for the conceptual framework and this has been reiterated by the IASB and in the frameworks of individual countries such as the SoP (ASB 1999). However as argued above the accountability requirements of profit-oriented bodies do not correspond to the accountability requirements of public sector bodies that is focused on stewardship and the proper and efficient use of public money. Economic decision-making may be appropriate (the future grows from the past and ex post information is needed to help formulate policies for the future) but not usually with a view to public sector wealth creation.

The apparent lack of interest in developing a public sector conceptual framework coupled with the introduction of NPM and the ascendancy of accruals accounting has led to apparent acceptance of the private sector model by countries across the world. New Zealand has adopted the private sector framework for many years (Pallot, 1997) and many countries are currently adapting conceptual frameworks for the public sector. The IFAC in the late 1990s embarked on the development of a set of International Public Sector Accounting Standards (IPSAS) essentially based on IASs. By 2003 IFAC had published 20 standards and several exposure drafts before it moved on to consider unique aspects of government accounting such as non-exchange transactions and the accounting for social policies. But by merely adopting or reinterpreting private sector frameworks or commercial accounting standards the uniqueness of government accounting was not given primary focus. Unique features such as taxation revenue; pensions and benefits; government debt capacity limits and government grants cannot be dealt with appropriately as afterthoughts.

The balance sheet focus does not fit well with a public service perspective. The matching principle is valuable in determining comparable performance data, but wealth creation has little relevance in the context of PBEs. If the concept of comprehensive income is not related to a capital maintenance concept there is a danger that many of the benefits of accrual accounting to the public sector (benchmarking, performance comparisons, asset management) may be jeopardised. The concepts of revenues and expenses are important in a public sector service provision and should not be hidden in gains and losses. Furthermore, the balance sheet is extremely difficult to compile on a reliable and relevant basis. The valuation problems relating to community and heritage assets have not been consistently thought through, the problems of accounting for social programmes or political commitments even more so. Consequently, working from the balance sheet as the primary document is contentious in a public sector context.

To use the definitions of the elements of accounting statements determined for profit orientated entities they have to be interpreted to have a different meaning for public benefit entities. This gives the illusion of convergence but arguably is more a pretence or sham (Newberry, 2002) and indeed, as argued here such convergence of conceptual frameworks would not do justice to the inherent differences between the sectors.

There has been significant global accounting convergence including convergence between public and private sector accounting. Reform of public sector financial accounting has brought it more in line with commercial accounting and may enable benefits in terms of the accountability for the quantity and the quality of services that are provided. There is obvious value in using accepted commercial practice where it is valid to do so and clearly stating non-adherence when it is not. On the other hand, a generic model of accounting cannot apply when the purpose and needs of accounting are so different. A robust, universal conceptual framework across sectors appears unachievable and undesirable. The differing interpretations and modifications may give the illusion of convergence but in many ways it is a pretence masking valid differences in accountability requirements – a universal framework is 'a bridge too far'.

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Earnings management within Europe: the effects of member state audit environment, audit firm quality and international capital markets

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Abstract—This paper studies earnings management in a European context. More specifically, the effects of three factors on earnings management within Europe are studied: member state audit environment, audit firm quality and presence in international capital markets. The national audit environments within Europe vary strongly in terms of independence rules and auditor liability. Hence, it can be expected that the restrictions imposed by national audit environments on earnings management vary. However, there are two factors that can mitigate the national audit environment effect: Big Four audit firm quality and a company's reliance on international capital markets. Using data for the period 1992–2000 from listed firms in three EU countries with clearly distinct audit environments (France, Germany and the UK), we have the following main findings. First, a stricter audit environment reduces the magnitude of earnings management, irrespective of the type of auditor (Big Four audit firm or non-Big Four audit firm). Second, there is no evidence of an international Big Four audit quality effect in Europe. Third, a company's reliance on international capital markets does not limit its earnings management.The evidence provided in this study is relevant for the current debate in the European Union on the harmonisation of auditing. For the comparability of earnings, not only is the standardisation of financial reporting important but also the standardisation of enforcement mechanisms, as embodied in the national audit environment and the quality of audit firms. The results of this study suggest that the enforcement of financial reporting still varies strongly across member states of the EU.

1. Introduction

This study examines the effects on earnings management of differences in EU member states' audit environments, audit firm quality and reliance on international capital markets. Our paper contributes to the literature in three ways. First, Gore et al. (2001) pointed out that there is an 'increasing interest in the impact of different economic environments and GAAP regimes on the attributes of accounting earnings (Pope and Walker, 1999; Ali and Hwang, 2000; Ball et al., 2000), and on the incidence of earnings and forecast management (Brown and Higgins, 2001; Leuz et al., 2003)'. Our paper contributes to this increasing interest by analysing the incidence of earnings management in three European countries: France, Germany, and the UK. These three countries clearly vary in terms of their audit environment (independence rules and auditor liability). These three countries are also the originating countries of three distinct legal traditions: French code law, German code law and English common law (LaPorta et al., 1998).[1] We study the effect of differences in national audit environments on the magnitude of earnings management. Second, given that there is strong evidence in the US of Big Four audit firm conservatism (e.g. Becker et al., 1998), we consider whether Big Four[2] auditors constitute a constraint on earnings management in the three European countries under study and if so, whether this quality effect overrides differences as a result of national audit environments. In other words, to what extent do the international Big Four audit firms provide a standardised high quality audit across different jurisdictions within Europe? Finally, we consider whether a listing on the New York Stock Exchange

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[1] For a detailed description of the legal and accounting environment of these three countries, we refer to Giner and Rees (2001).

[2] For convenience, this paper uses the term 'Big Four auditor' to identify the large international audit firm networks. Some of the studies referred to were conducted before the mergers resulted in a reduction to four international audit firm networks.

(NYSE) influences the incidence of earnings management. The effect of a listing on an international capital market can be twofold. A foreign exchange listing might result in additional regulatory requirements reducing national opportunities for earnings management. However, international capital market pressures might also give additional incentives for increasing the level of earnings management. The net effect of these opposing forces is, a priori, unclear.

The results of this study are relevant for the current discussion on the comparability of financial statements within the EU, and specifically the comparability of earnings. It is assumed that the implementation of the 4th and 7th Directive has increased the comparability of financial statements within the EU. Further, expectations are that the requirement for listed companies in the EU to apply International Financial Reporting Standards (IFRS) for the consolidated financial statements as of the year 2005 will further increase comparability of earnings. However, the comparability of earnings reported not only depends on the set of accepted accounting standards, but also on the national quality of audits and the constraints imposed on earnings management by the national audit environment. So far, the standardisation of national auditing laws and regulations within the European Union has been rather limited (Buijink et al., 1996).

Related to this issue is whether the Big Four audit firms provide the same audit quality across countries. While the minimum levels of national audit quality might vary from country to country, it could be argued that the Big Four audit firms have strong incentives to provide the same high audit quality level in different countries. The reason is that their clients attract capital from international markets, and even national audit failures will affect their international reputation.

The main findings of this study are the following. First, the magnitude of earnings management across countries in the EU appears to be a function of differences in national audit environments. In particular, the results suggest that companies in a country with a strict audit quality regime engage less in earnings management compared to companies in a country with a more flexible audit regime. Second, the presence of a Big Four auditor cannot override the observed differences in level of earnings management as a result of the national audit environment. In addition, the Big Four audit quality effect is not found to be uniform across European countries. Finally, the results regarding the reliance on international capital markets suggest that a cross-listing on the NYSE does not constrain earnings management but rather is associated with a higher level of abnormal working capital accruals. Overall, these results imply that stricter auditor independence regulation can increase earnings quality, that there is no global Big Four audit quality effect in Europe, and that the bonding role of SEC regulation does not limit earnings management of European companies.

The remainder of this paper is organised as follows. In Section 2, we review relevant previous literature. In Section 3, we develop our research hypotheses. The differences in audit environment between France, Germany and the UK are described in Section 4. Sections 5 and 6 describe the sample selection procedure and the research design. In Sections 7 and 8, we present the empirical results of the main analysis and sensitivity analyses. Finally, we draw conclusions, address limitations of the study and give suggestions for future research.

2. Previous literature

2.1. *International differences in earnings management*

Ball et al. (2000) suggest that the demand for accounting earnings is systematically different in code-law countries compared to common-law countries. Common-law countries are characterised by: transactions at 'arms-length'; a diverse base of investors; and a relatively high risk of litigation. In code-law countries, capital markets are less active. Companies are more financed by banks, other financial institutions and the government, which results in less need for public disclosure. Moreover, litigation rates are relatively low. Daske et al. (2003) provide evidence that discontinuities in the distribution of earnings are more pronounced in code-law countries, and especially in German accounting origin countries, compared to the US and the UK. Hence, earnings management and loss avoidance practices appear to be more prevalent in companies from code-law countries compared to companies from common-law countries.

Leuz et al. (2003) provide evidence suggesting that companies in countries with developed equity markets, dispersed ownership structures, strong investor rights and legal enforcement engage in less earnings management.

Coppens and Peek (2005) examine earnings management by private companies in Europe. They find that private European companies in countries with low financial and tax alignment avoid small losses, and that private European companies in countries with high financial and tax accounting alignment manage earnings to reduce taxes.

In this paper, we focus on the variation in the level of earnings management of companies within Europe. We select one common-law country (UK) and two code-law countries (France and Germany). These three countries are clearly distinct from each other in terms of audit environment. Following the results of Leuz et al. (2003), France and Germany are in the same institutional cluster, defined as 'insider economies with less-developed stock markets, concentrated ownership, weak investor rights, but strong legal enforcement'. However, France and Germany are very different in terms of flexibility of audit quality regime. We examine to what extent the differences in audit environment in each of the three countries have an effect on the extent of earnings management.

2.2. Audit constraint on earnings management

Evidence has been provided in the US and the UK that Big Four audit firms constitute a constraint on earnings management. Using US data, DeFond and Jiambalvo (1991) show that non-fraudulent clients of Big Four auditors are less likely to have errors or irregularities, which are considered to be proxies for earnings management. In a subsequent study, DeFond and Jiambalvo (1993) provide evidence that auditor-client disagreements, resulting from incentives to manage earnings, are more likely to occur in the case of a Big Four auditor.

Similarly, Becker et al. (1998) provide evidence that clients of non-Big Four auditors report discretionary accruals that increase income relatively more than the discretionary accruals reported by clients of Big Four auditors. Moreover, it was found that the mean and median of the absolute value of discretionary accruals are greater for firms with non-Big Four auditors. Francis et al. (1999) report for a sample of NASDAQ firms that, even though Big Four auditors have higher levels of total accruals, they also have lower amounts of estimated discretionary accruals. Chung et al. (2003) find evidence in the US that Big Four auditors influence their clients to adopt more conservative accounting procedures. For UK firms, Gore et al. (2001) show that Big Four auditors are more able to constrain earnings management than non-Big Four auditors when a high level of non-audit services is provided.

Despite these consistent findings of a Big Four audit firm quality effect, it should be noted that nearly all studies are conducted within Anglo-Saxon countries. In the context of this study, it can be questioned whether the Big Four audit firm quality effect holds in all audit environments. For example, Francis and Wang (2004) document that Big Four auditor conservatism is greater in countries with strong investor protection environments and a common law legal tradition.

We examine whether Big Four audit firms reduce the level of earnings management in the three European countries (two code law and one common law) included in our study, to what extent this quality effect overrides differences in national audit environments, and more importantly whether the effect is similar in all three countries.

2.3. Measures of earnings management

Different models have been suggested in the literature to measure earnings management. Healy and Whalen (1999), Young (1999) and McNichols (2000) provide a good overview of the earnings management literature and the different models used to measure earnings management. Three different approaches are commonly used to detect earnings management: (i) aggregate accruals models; (ii) specific accruals models; and (iii) frequency of distribution approaches (McNichols, 2000). Unfortunately, none of the existing approaches perfectly captures discretionary accruals. Being aware that there is no best method to estimate discretionary accruals, we have chosen to examine working capital accruals to detect earnings management for the following reasons (see Peasnell et al., 2000; DeFond and Park, 2001).

First, DeFond and Jiambalvo (1994) and Teoh et al. (1998) argue that working capital accruals are more susceptible to manipulation than non-working capital accruals. Beneish (1998) and Young (1999) argue that focusing exclusively on the working capital component of total accruals is "potentially more appealing since continuous (i.e., year-on-year) earnings management via the depreciation accrual is likely to have limited potential due to its visibility and predictability" (Peasnell et al., 2000).

Second, the commonly used regression-based accrual estimation methods (e.g. the Jones model) require large time-series of observations or a large number of industry-specific observations (e.g. DeFond and Jiambalvo, 1994). Using working capital accruals, we avoid the regression estimation problems to detect earnings management that occur outside the US due to smaller sample sizes. Indeed, one could argue that small-sample problems may increase the inaccuracy in estimating discretionary accruals.

3. Development of hypotheses

The main argument in this paper concerns the effects of differences in national audit environments on earnings management by companies. The national audit environments within Europe vary strongly in terms of independence rules and auditor liability. Hence, it can be expected that the restrictions imposed by national audit environments on earnings management vary. We hypothesise that:

> **Hypothesis 1:** Companies in EU member states with strict audit quality regimes report ceteris paribus relatively lower absolute values of ab-

normal working capital accruals compared to companies in EU member states with flexible audit quality regimes.

It can be argued that the expected national audit environment effect on earnings management is influenced by the type of audit firm. This expectation is based on the argument that Big Four audit firms attempt to control the quality of their audits across jurisdictions. As the production of their audits is based on internationally recognised brand names, they have an incentive to provide a uniform level of audit quality in different countries. Consequently, it is hypothesised that:

> **Hypothesis 2:** The magnitude of the absolute value of abnormal working capital accruals is ceteris paribus less affected by the type of national audit quality regime, in case of a Big Four audit firm compared to a non-Big Four audit firm.

While the laws and regulations in EU member states might set a minimum level of audit quality, companies and their auditors might voluntarily opt for a higher audit quality level for capital market reasons. Companies relying on international capital markets do not only take the restrictions imposed by their national market into account, but also the restrictions of the host country where they have an additional listing. For example, a German company listed on the NYSE, is also affected by the restrictions imposed by the SEC. It can be expected that this will affect the level of earnings management by the German company. Indeed, foreign companies listed on the NYSE fall under the jurisdiction of the SEC, which is known to be a demanding regulator (Lang et al., 2003). Cross-listed firms on the NYSE face more requirements in terms of additional disclosure, reconciliation of net income and shareholders' equity to US GAAP, and are subject to a higher litigation risk. However, it should be acknowledged that prior to the Sarbanes-Oxley Act (2002) the requirements for foreign firms cross-listed on the NYSE were less strict than for domestic firms. For example, during the period of our study (1992–2000), the NYSE permitted listed non-US companies to follow home country practices with regard to corporate governance and audit requirements. When the Sarbanex-Oxley Act comes into force for non-US companies with a listing on the NYSE (which will be for fiscal years ending after June 15, 2006), the flexibility of these non-US companies to follow home country practices with respect to corporate governance and audit requirements will be strongly reduced. Despite the fact that during the period of study the SEC was less strict for foreign registrants, it can be expected that the US environment was still more demanding than the EU environment.

Reliance on international capital markets might also have an opposing effect on earnings management. International capital markets might increase the incentives for earnings management, for example as a result of capital market pressures to meet management forecasts. Hence, the direction of the effect of reliance on international capital markets on earnings management is unclear. Lang et al. (2003) provide evidence that non-US firms cross-listed in the US appear to be less aggressive in terms of earnings management and report in a more conservative and timely manner compared with a matched sample of foreign firms not cross-listed in the US but satisfying the listing criteria for the exchange on which the cross-listed firm is traded. However, Joos (2003) argues, 'although the viewpoint of the bonding role of SEC regulation is well-established in the literature, recent empirical work questions the effectiveness of the SEC regulation and its enforcement'. A more recent study by Lang et al. (2004) provides evidence that the earnings characteristics of non-US firms listed in the US differ systematically from domestic US-listed firms. A potential explanation for this result is that the SEC's enforcement policy is less effective against foreign firms. Given that the direction of the effect of a cross-listing on the NYSE is a priori unclear, we hypothesise that:

> **Hypothesis 3:** The absolute value of abnormal working capital accruals of companies cross-listed on the NYSE will ceteris paribus differ from the absolute value of abnormal working capital accruals of companies not relying on this international source of capital.

4. Member State Audit Environment

The Eighth Directive (84/253/EEC) aimed to achieve harmonisation of auditing regulation within the EU. However, the Directive was very general and EU member states were free to maintain and apply specific national auditing regulations. This has resulted in a large variation in auditing regulation across EU member states.[3] This variation is clearly shown in the study of Buijink et al. (1996) providing a detailed description of the auditing regulations in the member states of the EU. The countries included in our study (France, Germany and the UK) also clearly show variation in strictness of auditor independence regulation. We rank the regulatory systems in the countries included in this study as follows from a relatively strict audit quality regime to a more flexible audit quality regime: France, UK and Germany. This ranking is based on the presence or absence of auditor independence rules, which aim to promote audit quality in these countries and for which there is cross-country variation. In particular, we consider auditor independence rules for listed firms on: length of audit mandate, rotation of audit partners, number of statutory auditors, approval of appointment, disclosure of audit fees, provision of management advisory services, advertising, peer review, review by regulators, auditors moving to clients or vice versa, and audit committees. Furthermore, we compare the risk of litigation in the three countries under study. Table 1 provides an overview of the presence or absence of each of these independence rules during the period under study (1992–2000) based on Buijink et al. (1996), Ordelheide (2001) and publications available on the websites of the national auditing professions (http://www.icaew.co.uk; http://wwwcncc.fr; http://www.idw.de).

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[3] It is noted that the Eighth Directive of 1984 is currently being revised. The European Commission expects to publish the revised Eighth Directive in 2006. It is expected that the revised Directive will reduce the large variation in auditing regulations across EU member states.

France is the country that has the highest number of regulations regarding audit quality. In particular, France imposes restrictions on the minimum length of the audit mandate, listed firms that need to consolidate are required to have a joint audit and the appointment of the statutory auditor needs to be approved by the stock exchange regulatory authority. The provision of management advisory services and advertising are not allowed and there are restrictions on auditors moving to clients or client personnel moving to audit firms. Statutory auditors are subject to reviews by peers and regulators. The UK is classified as the country with the second most strict audit quality regime. In particular, the UK has a requirement for rotation of audit partners, audit fees must be disclosed, auditors are subject to reviews by regulators, and there are restrictions on auditors moving to clients or client personnel moving to audit firms. Furthermore, the UK has a high risk of litigation compared to France and Germany. As shown in Table 1, Germany has a very limited number of auditor independence rules to safeguard audit quality. Moreover, the risk of litigation in Germany is low (see Blij et al., 1998). Hence, Germany has the most flexible audit quality regime of the three European countries included in our study. As stated in Hypothesis 1, we expect that companies domiciled in countries with a stricter audit quality regime (France and UK) will engage less in earnings management compared to companies in countries with a more flexible audit quality regime (Germany). Subsequently, we test whether the expected national audit environment effect is mitigated by audit firm quality and reliance on an international capital market, more specifically a cross-listing on the NYSE.

5. Sample selection

To collect data for this study, we used the August 2002 version of the Osiris database and the June 2000 and June 1998 versions of the Worldscope database. The Osiris and Worldscope databases contain historical financial data up to 10 years of listed firms around the world. We used the most recent version as well as two earlier available versions of the database to avoid potential survivorship bias.[4] Indeed, companies that went bankrupt are no longer included in a newer version of the database. Data are collected for France, Germany, and the UK for the period 1992–2000. All three countries have currently sizable and relatively well-developed capital markets. Consistent with previous research (e.g. Becker et al. 1998), financial institutions (SIC 6000–6999) and utility companies (SIC 4000–4999) were excluded. These industries have specific accounting requirements, have a high degree of complexity and have a different accrual generating process. To reduce the effect of outliers, we exclude companies in the top and bottom 1% of abnormal working capital accruals. These sampling criteria result in a total number of usable observations of 17,394 companies (France: 3,904; Germany: 4,067; UK: 9,423). All companies in our sample are firms listed on a stock exchange and 315 or 1.81% of the 17,394 firm-year observations include a cross-listing on the NYSE.

6. Research design

As argued above, we examine working capital accruals to detect earnings management because working capital accruals are more susceptible to manipulation than non-working capital accruals. Like DeFond and Park (2001), we define working capital accruals as the change in non-cash working capital (WC). Abnormal working capital accruals (AWCA) are defined as realised working capital minus normal working capital. Normal working capital is assumed to be a fixed proportion of sales (Dechow and Kothari, 1998; DeFond and Park, 2001). We approximate the expected working capital in the current year by the working capital of the previous year.[5] This gives the following expression:

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[4] It is acknowledged that a potential survivorship bias cannot be ruled out given that we had to use the June 1998 Worldscope database for our sample that stretches back to 1992. However, prior research (e.g. DeFond and Jiambalvo, 1994) has shown that financially stressed companies engage on average in more earnings management compared to non-stressed companies. Hence, including soon-to-be bankrupt companies will at a minimum not work against finding support for our hypotheses, and are likely to reinforce our results.

[5] Tests were also conducted with taking the average of the previous two years. This gives very similar results. However, the data loss was substantial. Therefore, we present the results using only working capital of the previous year.

Table 1
Overview of auditor independence rules for listed firms in France, UK and Germany, 1992–2000

	FRANCE	*UK*	*GERMANY*
	Strict		**Flexible**
Length of the first audit mandate	6 Years	1 Year[a]	Not regulated
Length of the renewed audit mandate	6 Years	1 Year[a]	Not regulated
Audit partner rotation requirement	No	Yes[b]	No
Joint audit requirement	Yes a joint audit is required for a restricted group of companies, including listed firms that need to consolidate	No	No
Requirement of approval of appointment of statutory auditor by any party other than the appointing party	Yes for listed firms, banks and other regulated industries	No except for banks and other regulated industries	No except for banks and other regulated industries
Disclosure of audit fees	No	Yes	No
MAS allowed for statutory auditors	No	Yes[c]	Yes[d]
Advertising allowed	No	Yes	No[e]
Peer review	Yes every 3 years for audit firms with listed firms	No	No
Review by regulators	Yes every year	Yes every 5 years for audit firms with listed firms	No
Restrictions on auditors moving to clients or client personnel moving to audit firms	Yes	Yes	No
Audit committee requirement	No	No[f]	No

Sources: Buijink et al. (1996), Ordelheide (2001) and publications available on the websites of the national auditing professions.

[a] Private companies are not required to re-elect statutory auditors each year. In that case, the statutory auditor remains appointed until action is taken to terminate the appointment.

[b] Requirement effective for listed firms from 1 September 1997.

[c] The provision of book-keeping and accounting services is forbidden in the case of listed or public-interest entities except if the services are of a routine clerical nature. Audit firms within the same legal entity cannot provide legal services.

[d] The provision of book-keeping and accounting services is forbidden.

[e] All forms of advertising are forbidden. However, an auditor may provide the name of his firm in academic articles, speeches, seminars, etc.

[f] The Bank of England requires banks to have an audit committee unless there are sound reasons for not having an audit committee. The Cadbury Committee recommended the establishment of audit committees but this was not mandatory.

$$AWCA_t = WC_t - [(WC_{(t-1)}/S_{(t-1)})* S_t]$$

where:

$AWCA_t$ = Abnormal working capital accruals in year t;

WC_t = Non-cash working capital in year t;

$WC_{(t-1)}$ = Non-cash working capital in the year preceding year t;

S_t = Sales in year t;

$S_{(t-1)}$ = Sales in the year preceding year t.

Subsequently, the abnormal working capital accruals of the year are scaled by the sales of that year. Our empirical analysis will focus on the absolute value of discretionary accruals.[6] Previous studies in this area tend to focus on positive discretionary accruals, the reason being that auditors have a higher risk of reputation loss in case of upward managed earnings compared to downward managed earnings. Hence, audit quality differences would especially be revealed in case of upward managed earnings. However, in the countries under study, there might be variations in the direction of the incentives to manage earnings. For example, in more tax-oriented reporting systems (e.g. Germany), audit quality might be revealed by limiting the opportunities for negative discretionary accruals. Therefore, we will focus on discretionary accruals per se. In this respect, Warfield et al. (1995) also indicated that the absolute value of discretionary accruals is a good proxy for the combined effect of income-increasing and income-decreasing earnings management decisions.

The three main company variables of interest in this study are: (1) in which EU member state the company operates; (2) whether the company is audited by a Big Four or a non-Big Four audit firm; and (3) whether the company is cross-listed on the NYSE. The effect of the national audit regime is measured with a dummy variable for each country under study. The effect of international capital markets is measured with a variable indicating whether the company is cross-listed on the NYSE.[7] Of all international capital markets, a NYSE listing can be expected to have the strongest effects both in terms of additional constraints and additional incentives. In terms of regulations regarding the quality of financial reporting, the NYSE and the SEC have the reputation of being the most restrictive. However, the NYSE is also known for having strong incentives to meet capital market expectations. Furthermore, we include a variable PYLIST for companies anticipating a listing on the NYSE as the reporting behaviour of these companies is also likely to be different.[8] We consider a period of one year prior to listing.

Consistent with previous studies on earnings management, the following variables are included in the model to control for earnings management incentives. First, we control for the size of a company proxied by the natural logarithm of total assets. It is argued in the literature that larger firms prefer downward earnings management due to political costs (see Young, 1999; Gore et al., 2001). Second, a leverage or gearing variable is included in the model. The direction of the effect of this variable is, a priori, unclear. Highly leveraged firms may have incentives for income-increasing earnings management in view of debt covenant violations (DeFond and Jiambalvo, 1994). However, financially distressed companies have also large negative accruals as a result of contractual renegotiations providing incentives to reduce earnings (Becker et al., 1998). Third, we include a performance measure as a control variable. Consistent with Dechow et al. (1995) and Young (1999), we include cash flow from operating activities to control for underlying (poor) performance, which may induce income-increasing earnings management. Cash flow from operating activities is computed indirectly given that direct information on operating cash flow is not widely available in the countries included in our study. Following Leuz et al. (2003), cash flow from operating activities is computed by subtracting the accrual component from earnings.[9] Leuz et al. (2003) compute the accrual component of earnings in a similar way to Dechow et al. (1995): change in non-cash working capital minus depreciation and amortisation. Finally, we include industry dummies to control for industry effects on earnings management. Formally, the model is as follows:

$$\begin{aligned} AWCA_t \ &= \beta_0 + \beta_1\, UK + \beta_2\, FRA + \beta_3\, Big4_t + \\ &\quad \beta_4 NYSE_t + \beta_5 PYLIST_t + \\ &\quad \beta_6 LNASSETS_t + \beta_7 GEAR_t + \\ &\quad \beta_8 OPCF_t + \beta_9 IND_{it} + \varepsilon_t \end{aligned}$$

where:

$AWCA_t$ = Abnormal working capital accruals in year t;

UK = Dummy variable (UK company = 1, else 0);

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[6] Note that we use the terms discretionary accruals and abnormal working capital accruals interchangeably.

[7] We requested and received a list from the NYSE with the names of all non-US companies listed on the NYSE for each year during the period under study 1992–2000.

[8] We would like to thank the referee for suggesting to include this variable.

[9] A possible consequence is that this may induce a negative relationship between our earnings management measure, abnormal working capital accruals, and our OPCF measure. We do not believe though that this will affect the impact of our variables of interest on the magnitude of abnormal working capital accruals. If we run the multivariate analysis without the OPCF variable, this does not change the results.

Table 2
Descriptive statistics for absolute value abnormal working capital accruals

Panel A: Absolute value abnormal working capital accruals across countries

	N	Mean	Std. dev.	25%	50%	75%
France	3,904	0.052	0.074	0.011	0.029	0.060
Germany	4,067	0.062	0.084	0.013	0.033	0.075
UK	9,423	0.057	0.081	0.012	0.030	0.065
Pooled	17,394	0.058	0.080	0.012	0.031	0.066

Panel B: Test of means (Bonferroni test): Multiple comparisons of absolute value of abnormal working capital accruals

Country i	Country j	Mean difference (i–j)	Standard error	Significance
Germany	France	0.011	0.001	0.000
	UK	0.005	0.001	0.001
France	UK	–0.005	0.001	0.002

Panel C: Descriptive statistics

	Minimum	Maximum	Mean	Std. Deviation
LNASSETS	3.690	19.040	12.027	1.996
OPCF	–7.080	4.310	0.071	0.191
GEAR	–95.465	97.742	0.409	2.760
NYSE	0	1	0.018	0.13
PYLIST	0	1	0.002	0.045
Big4	0	1	0.640	0.480

Variable definitions:
LNASSETS = Natural logarithm of total assets;
OPCF = Cash flow from operating activities scaled by total assets;
GEAR = Ratio of long term debt to common equity;
NYSE = Dummy variable (Company is listed on the NYSE = 1, else 0);
PYLIST = Dummy variable (Company is listed on the NYSE in year$_{t+1}$ = 1, else 0);
Big4 = Dummy variable (Company has Big Four auditor = 1, else 0).

FRA = Dummy variable (French company = 1, else 0);

Big4$_t$ = Dummy variable (Company has Big Four auditor = 1, else 0);

NYSE$_t$ = Dummy variable (Company is listed on the NYSE = 1, else 0);

PYLIST$_t$ = Dummy variable (Company is listed on the NYSE in year$_{t+1}$ = 1, else 0);

LNASSETS$_t$ = Natural logarithm of total assets in year t;

GEAR$_t$ = Ratio of long term debt to common equity in year t;

OPCF$_t$ = Cash flow from operating activities in year t scaled by total assets;[10]

IND$_{it}$ = Industry dummies (SIC 10–17: Mining & Construction; SIC 20–39: Manufacturing; SIC 50–59: Wholesale trade; SIC 70–89: Services).

It should be noted that Germany is the country of reference and SIC 01–09 (agriculture, forestry and fishing) is the industry of reference.

7. Empirical results

The empirical analysis relates to the period 1992–2000. As argued above, we use abnormal working capital accruals as a measure for earnings management. Table 2, Panel A, provides descriptive statistics on the magnitude of abnormal working capital accruals in France, Germany and the UK. The table clearly suggests that the magnitude of earnings management is the highest in Germany (0.062), followed by the UK (0.057) and France (0.052). This ranking corresponds with our expected ranking of countries based on the strictness of audit quality regime. The test of means, presented in Panel B of Table 2, shows that all differences in earnings management levels between these countries are significant. The descriptive statistics for the independent variables are reported in Panel C of Table 2.

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[10] As a sensitivity test, we have also scaled operating cash flows by lagged total assets. This does not change the results.

The Pearson correlation matrix presented in Table 3 shows that while there are several statistically significant correlations between some of the explanatory variables, none are highly correlated. In addition, variance inflation factors (VIFs) are low which further indicates that there is no multicollinearity. The correlation matrix further indicates that there is a positive correlation (0.268) between a Big Four audit firm and a sample observation from the UK, while this correlation is negative for a sample observation from France (–0.207) and Germany (–0.111). This is consistent with prior research on audit market structure providing evidence that Big Four audit market concentration is much higher in Anglo-Saxon countries compared to continental European countries (Vander Bauwhede and Willekens, 2004). In addition, consistent with expectations, there is a positive correlation between company size and a Big Four auditor (0.270) and between company size and a listing on the NYSE (0.264).

Table 4 presents the univariate results for the pooled sample and the three countries separately. The results of the pooled sample show that the magnitude of income-decreasing abnormal accruals is not significantly different from the magnitude of income-increasing abnormal accruals. This finding suggests that the companies in our pooled sample manage their earnings both upwards and downwards. This is consistent with DeFond and Park (1997) showing that firms engage in income-increasing (decreasing) earnings management when earnings fall below (exceed) the sample median (by industry and year) and that have good (poor) future prospects based on analysts' forecasts. At a country level, we find that in France and the UK the magnitude of income-increasing abnormal accruals is not significantly different from the magnitude of income-decreasing abnormal accruals. However, in Germany we observe that the magnitude of income-increasing abnormal accruals is significantly higher than the magnitude of income-decreasing abnormal accruals. A priori, considering the importance of presenting positive earnings, it can be expected that listed companies have on average stronger incentives for income-increasing earnings management. As argued above, Germany is considered to have the least strict audit quality regime compared with France and the UK. Prior research (Hirst, 1994; Braun, 2001) suggests that auditors have a higher risk of reputation loss in cases where earnings are managed upwards compared with earnings managed downwards. However, if the audit quality regime is weak and the risk of litigation is low, auditors may not have sufficient incentives to be conservative.

The univariate results further show that for the pooled sample, Big Four auditors are associated with a significantly lower absolute value of abnormal working capital accruals compared with non-Big Four auditors, and also with a significantly lower magnitude of income-increasing and income-decreasing earnings management compared with non-Big Four auditors. Given that the UK has the largest number of observations in the pooled sample, this result may be driven by the UK. Indeed, we observe at a country level that this audit quality difference is most significant in the UK. In Germany, the audit quality difference is less significant and the differences between Big Four and non-Big Four auditors are smaller. In France the audit quality difference is not significant. The strong audit quality difference in the UK could be explained by the fact that the UK has a much stronger investor protection environment compared to France and Germany (LaPorta et al., 1998). Indeed, Francis and Wang (2004) provide evidence that Big Four auditor conservatism increases in more stringent investor protection environments. We explore the Big Four audit quality difference in the individual countries at a multivariate level in Section 8.

Table 4 also shows that the absolute value of abnormal working capital accruals is significantly lower for companies listed on the NYSE for the pooled sample. Distinguishing between income-decreasing earnings management and income-increasing management, it appears that only in the latter category does a NYSE listing have a significant effect. At the country level, we observe that companies listed on the NYSE are associated with a lower absolute value of abnormal working capital accruals, but this difference in magnitude is not significant in the individual countries. This is probably due to the very small number of observations with a NYSE listing when conducting the analysis at country level. It is acknowledged that in the pooled sample, the number of observations with a NYSE listing is also small (1.81%). Hence, caution is needed when drawing strong conclusions about the association between a NYSE listing and the level of earnings management.

Finally, it appears from Table 4 that focusing on the absolute value of abnormal working capital accruals gives overall stronger results than either income-increasing or income-decreasing abnormal working capital accruals. This could be due to the larger sample size when income-increasing and income-decreasing earnings management are combined, which increases the power of the tests. Moreover, focusing on the absolute value of accruals is appropriate as Warfield et al. (1995) show that the absolute value of accruals is a good proxy

Table 3
Pearson correlation matrix

	GERM	*UK*	*FRA*	*Big4*	*NYSE*	*PYLIST*	*LNASSETS*	*GEAR*	*OPCF*	*SIC00*	*SIC10–17*	*SIC20–30*	*SIC50–59*	*SIC70–89*	*VIF*
GERM	1														Reference
UK	–0.601	1													1.800
	(0.000)														
FRA	–0.297	–0.585	1												1.553
	(0.000)	(0.000)													
Big4	–0.111	0.268	–0.207	1											1.239
	(0.000)	(0.000)	(0.000)												
NYSE	–0.036	0.034	–0.004	0.094	1										1.093
	(0.000)	(0.000)	(0.614)	(0.000)											
PYLIST	0.002	–0.002	0.000	0.026	–0.006	1									1.007
	(0.744)	(0.744)	(0.953)	(0.001)	(0.421)										
LNASSETS	0.135	–0.210	0.114	0.270	0.264	0.074	1								1.369
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)									
GEAR	0.001	0.000	–0.002	0.004	0.000	0.000	0.000	1							1.000
	(0.879)	(0.964)	(0.836)	(0.586)	(0.976)	(1.000)	(0.952)								
OPCF	0.014	–0.025	0.016	0.028	0.024	0.010	0.107	0.000	1						1.015
	(0.072)	(0.001)	(0.032)	(0.000)	(0.002)	(0.179)	(0.000)	(0.997)							
SIC00	–0.082	0.120	–0.060	0.037	0.029	0.010	0.045	–0.004	0.010	1					Reference
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.201)	(0.000)	(0.615)	(0.187)						
SIC10–17	–0.024	0.040	–0.024	0.014	0.022	–0.010	0.063	–0.002	–0.041	–0.069	1				1.308
	(0.002)	(0.000)	(0.001)	(0.072)	(0.003)	(0.175)	(0.000)	(0.785)	(0.000)	(0.000)					
SIC20–39	0.163	–0.201	0.075	0.002	0.019	0.012	0.050	0.004	0.041	–0.299	–0.228	1			2.469
	(0.000)	(0.000)	(0.000)	(0.839)	(0.010)	(0.118)	(0.000)	(0.565)	(0.000)	(0.000)	(0.000)				
SIC50–59	–0.078	0.097	–0.036	0.036	–0.052	–0.013	0.002	–0.002	–0.001	–0.132	–0.100	–0.434	1		1.873
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.096)	(0.791)	(0.776)	(0.911)	(0.000)	(0.000)	(0.000)			
SIC70–89	–0.075	0.062	0.002	–0.084	–0.023	–0.013	–0.212	–0.002	–0.060	–0.132	–0.101	–0.437	–0.192	1	1.936
	(0.000)	(0.000)	(0.824)	(0.000)	(0.002)	(0.092)	(0.000)	(0.839)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		

Variable definitions:
GERM = Dummy variable (German company = 1, else 0); UK = Dummy variable (UK company = 1, else 0); FRA = Dummy variable (French company = 1, else 0); Big4 = Dummy variable (Company has Big Four auditor = 1, else 0); NYSE = Dummy variable (Company is listed on the NYSE = 1, else 0); PYLIST = Dummy variable (Company is listed on the NYSE in year_{t+1} = 1, else 0); LNASSETS = Natural logarithm of total assets; GEAR = Ratio of long term debt to common equity; OPCF = Cash flow from operating activities scaled by total assets; SIC 00 = Agriculture, Forestry & Fishing; SIC 10–17 = Mining & Construction; SIC 20–39 = Manufacturing; SIC 50–59 = Wholesale trade; SIC 70–89= Services.

Table 4
Univariate results for abnormal working capital accruals

	Pooled	*France*	*UK*	*Germany*
EARNINGS MANAGEMENT				
AWCA < 0: income-decreasing	–0.057 (n=8757)	–0.051 (n=2008)	–0.058 (n=4804)	–0.059 (n=1945)
AWCA ≥ 0: income-increasing	0.058 (n=8637)	0.052 (n=1896)	0.056 (n=4619)	0.066 (n=2122)
Difference (significance) (2-tailed)	t=–0.620 (0.536)	t=–0.399 (0.690)	t=1.549 (0.121)	t=–2.848 (0.004)
BIG 4 vs. NON BIG 4				
Absolute value AWCA				
Big 4	0.053 (n=11077)	0.050 (n=1763)	0.052 (n=7116)	0.060 (n=2198)
Non-Big 4	0.064 (n=6317)	0.053 (n=2141)	0.072 (n=2307)	0.066 (n=1869)
Difference (significance) (2-tailed)	t=–8.362 (0.000)	t=–1.397 (0.163)	t=–10.352 (0.000)	t=–2.283 (0.022)
AWCA < 0: income-decreasing				
Big 4	–0.053 (n=5708)	–0.049 (n=953)	–0.053 (n=3672)	–0.055 (n=1083)
Non-Big 4	–0.063 (n=3049)	–0.053 (n=1055)	–0.074 (n=1132)	–0.062 (n=862)
Difference (significance) (2-tailed)	t=5.628 (0.000)	t=1.293 (0.196)	t=7.227 (0.000)	t=1.920 (0.055)
AWCA ≥ 0: income-increasing				
Big 4	0.053 (n=5369)	0.051 (n=810)	0.051 (n=3444)	0.061 (n=1115)
Non-Big 4	0.064 (n=3268)	0.053 (n=1086)	0.070 (n=1175)	0.068 (n=1007)
Difference (significance) (2-tailed)	t=–6.168 (0.000)	t=–0.654 (0.513)	t=–7.481 (0.000)	t=–1.703 (0.089)
NYSE				
Absolute value AWCA				
NYSE listing	0.049 (n=315)	0.037 (n=67)	0.051 (n=210)	0.061 (n=38)
No NYSE listing	0.057 (n=17079)	0.052 (n=3837)	0.057 (n=9213)	0.062 (n=4029)
Difference (significance) (2-tailed)	t=–1.760 (0.078)	t=–1.628 (0.104)	t=–1.104 (0.270)	t=–0.097 (0.923)
AWCA < 0: income-decreasing				
NYSE listing	–0.052 (n=178)	–0.033 (n=38)	–0.056 (n=117)	–0.068 (n=23)
No NYSE listing	–0.057 (n=8579)	–0.052 (n=1970)	–0.058 (n=4687)	–0.058 (n=1922)
Difference (significance) (2-tailed)	t= 0.747 (0.455)	t=1.597 (0.110)	t=0.322 (0.748)	t=–0.534 (0.593)
AWCA ≥ 0: income-increasing				
NYSE listing	0.045 (n=137)	0.043 (n=29)	0.045 (n=93)	0.052 (n=15)
No NYSE listing	0.058 (n=8500)	0.052 (n=1867)	0.056 (n=4526)	0.066 (n=2107)
Difference (significance) (2-tailed)	t=–1.792 (0.073)	t=–0.654 (0.513)	t=–1.353 (0.176)	t=–0.615 (n=0.539)

Table 5
OLS regression results for pooled sample

Dependent variable:
Absolute value of abnormal working capital accruals ($N = 16{,}758^a$)

Variables	Parameter estimate	t-value	Significance
Constant	0.149	31.036	0.000***
UK	–0.012	–7.535	0.000***
FRA	–0.010	–5.879	0.000***
Big4	–0.001	–0.748	0.455
NYSE	0.018	3.999	0.000***
PYLIST	0.021	1.668	0.095*
LNASSETS	–0.006	–18.358	0.000***
GEAR	0.000	0.791	0.429
OPCF	–0.052	–16.579	0.000***
SIC10–17	0.026	8.494	0.000***
SIC20–39	–0.063	–3.441	0.001***
SIC50–59	–0.016	–7.550	0.000***
SIC70–89	0.012	5.669	0.000***
Adjusted-R^2	6.7%[b]		
F-value	100.703		0.000***

*p < 0.10, **p < 0.05, *** p < 0.01

Variable definitions:
UK = Dummy variable (UK company = 1, else 0);
FRA = Dummy variable (French company = 1, else 0);
Big4_t = Dummy variable (Company has Big Four auditor = 1, else 0);
NYSE_t = Dummy variable (Company is listed on the NYSE = 1, else 0);
PYLIST_t = Dummy variable (Company is listed on the NYSE in year_{t+1} = 1, else 0);
LNASSETS_t = Natural logarithm of total assets in year t;
GEAR_t = Ratio of long term debt to common equity in year t;
OPCF_t = Cash flow from operating activities in year t scaled by total assets;
SIC 10–17 = Mining & Construction;
SIC 20–39 = Manufacturing;
SIC 50–59 = Wholesale trade;
SIC 70–89 = Services.

[a] Due to lack of data, we could not measure cash flow from operating activities for all observations. This explains the difference in number of observations between the univariate results and the multivariate results.
[b] It is acknowledged that the adjusted R-Squared is low. However, the purpose of this study is not to develop a model to explain earnings management. We focus on the impact of the national audit environment, audit firm quality and international capital markets on the level of earnings management, while controlling for factors that are associated with earnings management based on prior research. A low adjusted R-Squared is not unusual in this type of studies (e.g. Becker et al., 1998). This remark also applies to the adjusted R-Squared of Tables 6–8.

to capture the combined effect of income-increasing and income-decreasing earnings management.

Table 5 presents the OLS regression results with Germany as the country of reference. The multivariate results confirm the significant differences in the magnitude of earnings management across countries. Companies in the UK and France engage significantly less in earnings management compared to Germany ($p<0.01$). This suggests that a stricter audit environment can reduce on average the extent to which companies engage in earnings management. Big Four audit firms do not appear to constitute a significant constraint on earnings management. While the univariate results did provide some evidence of a Big 4 audit quality effect, the results here do not. We further explore this by conducting a multivariate analysis at country level in Section 8. The multivariate results in Table 5 further suggest that, surprisingly, a NYSE listing does not constrain earnings management, but rather appears to be associated with a higher absolute value of abnormal working capital accruals ($p<0.01$). It is recalled that the univariate results indicated that a NYSE listing reduces earnings management. This apparent opposite result in the multivariate analysis could be explained by the fact that the multivariate analysis controls for the type of audit firm: nearly all

NYSE listed companies (97%) are audited by a Big Four audit firm. The multivariate results also suggest that the reporting behaviour of companies planning a listing on the NYSE differs from other companies in the sample. In particular, it appears that companies one year prior to a NYSE listing have a significantly higher level of abnormal working capital accruals ($p<0.10$). To reiterate, it is acknowledged that given the small number of observations in our sample with a NYSE listing, or anticipating such a listing, caution is needed when drawing strong conclusions about the association between a NYSE listing and the magnitude of accruals.

Finally, Table 5 shows for the control variables that larger companies engage significantly less in earnings management ($p<0.01$), and financially stressed companies (low or negative cash flow from operating activities) engage significantly more in earnings management ($p<0.01$), which is consistent with prior literature (e.g. DeFond and Jiambalvo, 1994). Furthermore, there are significant differences in the level of earnings management across industries in our samples: companies in the mining and construction industry and the services industry have a higher level of abnormal working capital accruals compared to companies in the agriculture, forestry and fishing industry. In addition, companies in the manufacturing and wholesale industry have lower abnormal working capital accruals compared with the agriculture, forestry and fishing industry.

In order to test whether the potential constraint of Big Four auditors on earnings management is uniform across countries, the regression analysis is performed on the sample of companies with a Big Four auditor and the sample of companies with a non-Big Four auditor separately. The results are presented in Table 6, Panel A and B.

The multivariate analysis in Panel A shows that the country differences remain significant even though all companies are audited by a Big Four audit firm ($p<0.01$). In other words, the Big Four audit firm quality effect appears not sufficiently strong to remove the effects of national audit environments on earnings management. This finding implies that Big Four audit firms do not constitute a uniform constraint on earnings management. The positive association between a NYSE listing and earnings management is also not eliminated by Big Four auditors, which is not surprising given that nearly all companies in our sample with a NYSE listing are audited by a Big Four audit firm. The OLS regression results for the non-Big Four audit firm sample are presented in Panel B of Table 6. As expected, the country differences remain: companies in France and the UK audited by a non-Big Four audit firm have significantly lower levels of abnormal working capital accruals compared to German companies audited by a non-Big Four audit firm. While a planned listing on the NYSE is associated with a significantly higher level of abnormal working capital accruals, an actual NYSE listing is not a significant variable in the non-Big Four audit firm sample. This is most likely due to the small sample size of non-Big Four audit firm clients listed at the NYSE.

8. Sensitivity analyses

To test the robustness of our results, we have performed the following sensitivity analyses. First, we have included year dummies in our model. This does not change the results (not reported) for our variables of interest. Second, we have used two additional models to measure accruals: current accruals and total accruals. Following Myers et al. (2003), we measure current accruals as: (change in current assets – change in cash and cash equivalents) – (change in current liabilities – change in short-term debt and current portion of long-term debt). Current accruals are subsequently scaled by average total assets. Following Dechow et al. (1995), we measure total accruals as: (change in current assets – change in cash and cash equivalents) – (change in current liabilities – change in short-term debt and current portion of long-term debt) – depreciation and amortisation. Total accruals are subsequently scaled by prior-year total assets. Table 7, Panel A, presents the results using these two alternative accruals measures. These results show that companies in France and the UK have a significantly lower absolute value of current and total accruals ($p<0.01$) compared with companies in Germany. This confirms our finding derived from Table 5 that the magnitude of earnings management is not uniform across the three European countries and suggests that a stricter audit environment constitutes a constraint on earnings management. The results further show that companies with a Big Four auditor do not have significantly lower current and total accruals in absolute value, consistent with the results from Table 5. We explore the Big Four auditor quality effect at country level further below. Companies cross-listed on the NYSE appear to have significant higher absolute levels of current and total accruals ($p<0.01$), which is consistent with the finding in Table 5 for abnormal working capital accruals. However, companies planning a listing on the NYSE do not appear to have a significant different magnitude of current and total accruals. It is recalled that the number of companies in our sample with a NYSE listing, or anticipating a NYSE listing, is low, so caution is needed when generalizing these results. When the regression analysis with current and total accruals as dependent variable is performed on the sample of companies with a Big Four audit firm and the sample of companies with

Table 6
OLS regression results for Big Four and non-Big Four audit firm samples

Panel A: Big 4 audit firm sample

Dependent variable:
Absolute value of abnormal working capital accruals (N = 10,710)

Variables	Parameter estimate	*t*-value	Significance
Constant	0.149	25.187	0.000***
UK	–0.014	–7.797	0.000***
FRA	–0.008	–3.559	0.000***
NYSE	0.017	4.026	0.000***
PYLIST	0.013	1.042	0.298
LNASSETS	–0.006	–15.708	0.000***
GEAR	–0.000	–0.417	0.677
OPCF	–0.048	–12.066	0.000***
SIC10–17	0.028	7.830	0.000***
SIC20–39	–0.008	–3.797	0.000***
SIC50–59	–0.019	–7.853	0.000***
SIC70–89	0.009	3.700	0.000***
Adjusted-R^2	6.4%		
F-value	67.668		0.000***

*$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

Panel B: Non-Big 4 audit firm sample

Dependent variable:
Absolute value of abnormal working capital accruals (N = 6,048)

Variables	Parameter estimate	*t*-value	Significance
Constant	0.144	15.658	0.000***
UK	–0.005	–1.975	0.048**
FRA	–0.011	–4.124	0.000***
NYSE	0.002	0.104	0.917
PYLIST	0.101	2.115	0.034**
LNASSETS	–0.006	–9.552	0.000***
GEAR	0.000	1.545	0.122
OPCF	–0.056	–10.933	0.000***
SIC10–17	0.024	4.113	0.000***
SIC20–39	–0.002	–0.636	0.525
SIC50–59	–0.009	–2.229	0.026**
SIC70–89	0.017	4.392	0.000***
Adjusted-R^2	6.4%		
F-value	38.404		0.000***

*$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

Variable definitions:
UK = Dummy variable (UK company = 1, else 0); FRA = Dummy variable (French company = 1, else 0); NYSE$_t$ = Dummy variable (Company is listed on the NYSE = 1, else 0); PYLIST$_t$ = Dummy variable (Company is listed on the NYSE in year$_{t+1}$ = 1, else 0); LNASSETS$_t$ = Natural logarithm of total assets in year t; GEAR$_t$ = Ratio of long term debt to common equity in year t; OPCF$_t$ = Cash flow from operating activities in year t scaled by total assets; SIC 10–17= Mining & Construction; SIC 20–39 = Manufacturing; SIC 50–59 = Wholesale trade; SIC 70–89 = Services.

Table 7
Sensitivity analyses

Panel A: OLS regression results for current and total accruals

	Current accruals			**Total accruals**		
	Pooled sample (N=16758)	Big 4 audit firm sample (N=10710)	Non-Big 4 audit firm sample (N=6048)	Pooled sample (N=16758)	Big 4 audit firm sample (N=10710)	Non-Big 4 audit firm sample (N=6048)
Variables	Parameter estimate (t-value)	Parameter estimate (t-value)	Parameter estimate (t-value)	Parameter estimate (t-value)	Parameter estimate (t-value)	Parameter estimate (t-value)
Constant	0.058 (40.377)***	0.053 (33.292)***	0.066 (21.962)***	0.241 (37.302)***	0.224 (29.103)***	0.274 (21.407)***
UK	–0.007 (–14.958)***	–0.007 (–13.965)***	–0.007 (–7.555)***	–0.034 (–16.016)***	–0.036 (–14.506)***	–0.034 (–8.514)***
FRA	–0.006 (–12.428)***	–0.006 (–10.133)***	–0.006 (–7.153)***	–0.028 (–11.715)***	–0.031 (–10.122)***	–0.023 (–6.190)***
Big4	0.000 (0.507)	n.a.	n.a.	0.001 (0.649)	n.a.	n.a.
NYSE	0.006 (4.416)***	0.004 (3.701)***	–0.007 (0.930)	0.026 (4.424)***	0.020 (3.664)***	0.012 (0.347)
PYLIST	0.005 (1.323)	0.003 (0.849)	0.018 (1.170)	0.026 (1.458)	0.015 (0.892)	0.083 (1.284)
LNASSETS	–0.003 (–28.713)***	–0.025 (–23.625)***	–0.003 (–17.461)***	–0.010 (–21.953)***	–0.008 (–16.719)***	–0.013 (–14.598)***
GEAR	0.000 (0.848)	–0.000 (–0.203)	0.000 (1.176)	0.000 (0.712)	0.000 (0.008)	0.000 (1.090)
OPCF	–0.005 (–21.736)***	–0.005 (–21.058)***	–0.004 (–9.972)***	–0.031 (–11.198)***	–0.010 (–2.493)**	–0.043 (–10.615)***
SIC10–17	0.003 (4.289)***	0.003 (3.250)***	0.005 (3.095)**	0.008 (2.164)**	0.007 (1.577)	0.016 (1.964)*
SIC20–39	–0.000 (–1.011)	–0.001 (–2.484)**	0.001 (1.094)	–0.078 (–3.106)***	–0.009 (–3.550)***	–0.003 (–0.603)
SIC50–59	0.001 (2.745)***	0.001 (1.893)*	0.003 (2.098)**	0.003 (1.038)	0.001 (0.309)	0.008 (1.362)
SIC70–89	0.003 (5.472)***	0.002 (3.166)***	0.005 (4.104)***	0.033 (11.108)***	0.029 (8.430)***	0.039 (6.920)***
Adjusted-R^2	10.9%	11.6%	9.4%	8.4%	6.4%	10%
F-value	157.369***	115.681***	54.941***	117.425***	60.229***	58.222***

*p < 0.10, **p < 0.05, *** p < 0.01, n.a.: not applicable

Variable definitions:
UK = Dummy variable (UK company = 1, else 0);
FRA = Dummy variable (French company = 1, else 0);
Big4$_t$ = Dummy variable (Company has Big Four auditor = 1, else 0);
NYSE$_t$ = Dummy variable (Company is listed on the NYSE = 1, else 0);
PYLIST$_t$ = Dummy variable (Company is listed on the NYSE in year$_{t+1}$ = 1, else 0);
LNASSETS$_t$ = Natural logarithm of total assets in year t;
GEAR$_t$ = Ratio of long term debt to common equity in year t;
OPCF$_t$ = Cash flow from operating activities in year t scaled by total assets;
SIC 10–17 = Mining & Construction;
SIC 20–39 = Manufacturing;
SIC 50–59 = Wholesale trade;
SIC 70–89 = Services.

Table 7
Sensitivity analyses *(continued)*

Panel B: OLS regression results with interaction variables

	Abnormal working capital accruals (N=16758)	**Current accruals** (N=16758)	**Total accruals** (N=16758)
Variables	Parameter estimate (t-value)	Parameter estimate (t-value)	Parameter estimate (t-value)
Constant	0.146	0.057	0.238
	(29.532)***	(38.782)***	(35.618)***
UK	–0.005	–0.006	–0.029
	(–2.200)**	(–8.225)***	(–8.707)***
FRA	–0.011	–0.006	–0.024
	(–4.487)***	(–8.754)***	(–7.253)***
Big4	0.002	0.001	0.007
	(1.115)	(1.308)	(2.129)**
Big4*UK	–0.009	–0.001	–0.008
	(–3.094)***	(–1.734)*	(–2.115)**
Big4*France	0.002	–0.000	–0.007
	(0.703)	(–0.938)	(–1.516)
NYSE	0.018	0.006	0.026
	(4.000)***	(4.422)***	(4.450)***
PYLIST	0.021	0.005	0.025
	(1.650)*	(1.311)	(1.443)
LNASSETS	–0.006	–0.003	–0.010
	(–18.244)***	(–28.625)***	(–21.895)***
GEAR	0.000	0.000	0.000
	(0.867)	(0.891)	(0.761)
OPCF	–0.051	–0.005	–0.031
	(–16.417)***	(–21.708)***	(–11.160)***
SIC10–17	0.026	0.004	0.009
	(8.557)***	(4.304)***	(2.173)**
SIC20–39	–0.006	–0.000	–0.007
	(–3.392)***	(–0.984)	(–3.110)***
SIC50–59	–0.016	–0.001	–0.003
	(–7.528)***	(–2.673)***	(–1.061)
SIC70–89	0.012	0.003	0.033
	(5.646)***	(5.471)***	(11.122)***
Adjusted-R^2	6.8%	10.9%	8.4%
F-value	87.712***	135.206***	100.998***

*$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

Variable definitions:
UK = Dummy variable (UK company = 1, else 0);
FRA = Dummy variable (French company = 1, else 0);
Big4$_t$ = Dummy variable (Company has Big Four auditor = 1, else 0);
NYSE$_t$ = Dummy variable (Company is listed on the NYSE = 1, else 0);
PYLIST$_t$ = Dummy variable (Company is listed on the NYSE in year$_{t+1}$ = 1, else 0);
LNASSETS$_t$ = Natural logarithm of total assets in year t;
GEAR$_t$ = Ratio of long term debt to common equity in year t;
OPCF$_t$ = Cash flow from operating activities in year t scaled by total assets;
SIC 10–17 = Mining & Construction;
SIC 20–39 = Manufacturing;
SIC 50–59 = Wholesale trade;
SIC 70–89 = Services.

a non-Big Four audit firm separately, we observe that the country differences in terms of level of earnings management remain significant ($p<0.01$). This is consistent with the finding derived from Table 6 that country differences remain significant even in the presence of a Big Four audit firm. In other words, the limits placed by Big Four audit firms on earnings management do not appear to be uniform across countries. Given that nearly all companies in our sample with a NYSE listing have a Big Four auditor, it is not surprising that the positive association between a NYSE listing and the level of accruals remains significant ($p<0.01$) in the subsample of companies with a Big Four audit firm, and not in the subsample of companies with a non-Big Four audit firm.

To explore the Big Four audit quality effect in more detail, we have included two interaction dummies, Big4*UK and Big4*FRA in our model. The results, presented in Table 7 Panel B, show an expected significant negative coefficient for the B4*UK variable with all our accruals measures, while the coefficient for the Big4*FRA variable is not significant for any of the accruals measures.

To further explore these findings, we have conducted a multivariate analysis for the individual country samples. The results are presented in Table 8. At a national level, these results indicate that only in the UK are Big Four audit firms significantly associated with lower levels of accruals. In France and Germany, there is no significant difference between Big Four auditors and non-Big Four auditors. These findings are in line with Francis and Wang (2004), showing that the effect of Big Four audit firm conservatism increases with the level of investor protection, including the ability to sue. Given that the UK has a stronger level of investor protection compared with France and Germany, this could explain why we only observe a Big Four audit firm quality effect in the UK, and not in France and Germany. At the individual country level, we further observe a positive association between a NYSE listing and the level of abnormal working capital accruals in the UK, but not in France and Germany. The latter could be due to lack of power given the very small number of observations with a NYSE listing in France and Germany. Overall, the results of the sensitivity analyses reinforce our findings that national differences in earnings management are dominant and remain significant even in the presence of a Big Four audit firm or a cross-listing on the NYSE.

9. Summary and conclusions

The purpose of this study was to examine the effects of national audit environment differences on earnings management. In addition, the extent to which national differences in earnings management are limited by audit firm quality and reliance on international capital markets was studied.

Our results provide evidence that the magnitude of earnings management is not uniform across the three European countries included in our study and that a stricter audit environment can reduce the magnitude of earnings management, irrespective of the type of auditor (Big Four audit firm or non-Big Four audit firm). In particular, the results suggest that companies in countries with flexible audit quality regimes report significantly higher absolute values of discretionary accruals compared to companies in countries with strict audit quality regimes. These observed EU member states' differences remain significant even in the presence of a Big Four audit firm. This finding implies that the limits placed by Big Four audit firms on earnings management are not uniform across countries. Furthermore, we find no evidence of a global Big Four audit quality effect in Europe. In particular, Big Four audit firm conservatism appears to be present only in the UK, and not in France and Germany. This reinforces our finding that national differences in earnings management are dominant and are not removed by the presence of a Big Four audit firm. This is also consistent with the finding of Francis and Wang (2004) that Big Four auditor conservatism increases in more stringent investor protection environments. Finally, our results with respect to the incidence of earnings management by companies attracting international sources of capital suggest that a NYSE listing does not constraint earnings management but is rather associated with higher levels of accruals. This finding puts the effectiveness of the bonding role of SEC regulation for non-US firms into question. This concern is consistent with other recent empirical work questioning the effectiveness of SEC regulation and its enforcement regarding foreign listed firms (Joos, 2003; Lang et al., 2004).

The evidence provided in this study is relevant for the current debate in the European Union on the harmonisation of auditing. For the comparability of earnings, not only the standardisation of financial reporting is important but also the standardisation of enforcement mechanisms as embodied in the national audit environment and the quality of audit firms. The results of this study suggest that the enforcement of financial reporting still varies strongly across member states of the EU.

The results of this study are subject to the following limitations. First, as in almost every cross-country study, it can be questioned whether the observed differences between countries are really attributable to differences in earnings management. One could argue that they are driven by economic and institutional differences. We have partly controlled for economic differences by including industry differences. In addition, we believe that

Table 8
OLS regression results at country level

Dependent variable:
Absolute value of abnormal working capital accruals

	France (N=3751)	**UK** (N=9198)	**Germany** (N=3809)
Variables	Parameter estimate (t-value)	Parameter estimate (t-value)	Parameter estimate (t-value)
Constant	0.120	0.136	0.197
	(13.070)***	(22.796)***	(14.586)***
Big4	0.003	–0.007	0.005
	(1.468)	(–3.897)***	(1.474)
NYSE	0.003	0.019	0.024
	(0.392)	(3.315)***	(1.451)
PYLIST	0.035	0.023	0.000
	(1.376)	(1.281)	(0.025)
LNASSETS	–0.005	–0.005	–0.009
	(–7.757)***	(–11.876)***	(–9.656)***
GEAR	0.000	–0.000	0.000
	(1.525)	(–0.103)	(0.090)
OPCF	–0.038	–0.050	–0.092
	(–3.734)***	(–13.951)***	(–8.858)***
SIC10–17	0.004	0.039	–0.000
	(0.673)	(10.116)***	(–0.074)
SIC20–39	–0.005	–0.005	–0.017
	(–1.357)	(–2.226)**	(–2.972)**
SIC50–59	–0.015	–0.016	–0.028
	(–2.987)**	(–6.084)***	(–3.868)***
SIC70–89	0.007	0.010	0.041
	(1.482)	(3.695)***	(5.255)***
Adjusted-R^2	2.7%	8%	9.3%
F-value	11.451***	81.293***	40.301***

*$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

Variable definitions:
Big4$_t$ = Dummy variable (Company has Big Four auditor = 1, else 0);
NYSE$_t$ = Dummy variable (Company is listed on the NYSE = 1, else 0);
PYLIST$_t$ = Dummy variable (Company is listed on the NYSE in year$_{t+1}$ = 1, else 0);
LNASSETS$_t$ = Natural logarithm of total assets in year t;
GEAR$_t$ = Ratio of long term debt to common equity in year t;
OPCF$_t$ = Cash flow from operating activities in year t scaled by total assets;
SIC 10–17 = Mining & Construction;
SIC 20–39 = Manufacturing;
SIC 50–59 = Wholesale trade;
SIC 70–89 = Services.

there are no major differences in the underlying economic situation between the three countries in the sample during the period under study. Therefore, the risk that economic differences have a significant impact on the results is considered to be low. It is acknowledged that there are institutional differences other than national audit environment between the countries under study. As pointed out by Leuz et al. (2003), it is difficult to fully control for the potential impact of other institutional factors since they are often complementary and as such difficult to disentangle. However, an interesting contribution of our paper is the finding of a significantly different level of earnings management between companies of countries (France and Germany) belonging to the same institutional cluster in terms of level of investor protection (Leuz et al., 2003), but that are clearly distinct in terms of flexibility of the audit quality regime.

Second, consistent with previous research on earnings management, we have controlled for the following earnings management incentives: size, leverage and performance. Nonetheless, it is acknowledged that there may be other incentives to manage earnings across the countries in the sample that have not been controlled for.

Finally, we are aware of the limitations of the working capital accruals model to detect earnings management. However, we have performed sensitivity analyses using alternative earnings management measures and overall the results appear to be robust.

Future research may benefit from examining whether the extent of earnings management between companies with similar earnings management incentives from different countries across the world differs as a function of auditor independence regulation and risk of litigation in their country of domicile. An attempt in this direction is made by Meuwissen et al. (2004). Future research could also look into the broad issue of the complex interaction between governance, institutional environment and financial reporting quality. It can be argued that financial reporting quality is endogenous and potentially depends on several inter-related factors such as institutional environment, capital markets, corporate governance regime and audit regime.

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Book Reviews

The Business of Football: Image Management in Narrative Communication. *Stephen Morrow.* Institute of Chartered Accountants of Scotland, 2005. ix and 72 pp. £10.

Football is a passion and a business. As such this makes it one of those rare academic subjects which are of interest both to specialised researchers and also to a more general audience. Stephen Morrow's book therefore bridges the territory between researchers interested in financial disclosure and members of the public who are football fans. The style of this research report reflects this. It is very easy to follow and read. However, at times this need to reach two audiences does mean that the academic side is a bit light.

The project is based on a sample of 30 football clubs over a five-year period starting with 1997/8. This included 20 clubs in the English FA Premier League and 10 clubs in the Scottish Premier League. Some 150 annual reports over these five years were analysed. Three principal issues were investigated:

- whether football clubs annual reports are becoming longer and with more narrative;
- whether the amount of narrative reporting is dependent on organisational form and location;
- whether football clubs use impression management. In other words are the annual reports used to present a more favourable picture of the football clubs' performance than is really warranted. This particular aspect of the research builds on the prior literature.

The project starts with a literature review. For the academic audience this is a little light, but for more general readers this is good background. Strangely, the aims of the project are set out in Chapter 3 rather than in the introduction as I would have expected. I would also have expected more details on the methods of the project.

The results of the project are set out in Chapter 4. In general, the findings are fairly predictable to those who know the area. First, football clubs annual reports are indeed becoming longer. They have increased from 27.2 pages to 33.7 pages over the five years. Scottish reports increased the most while listed clubs annual reports were the longest. Accounting narratives also increased the most. Second, the greatest percentage of narrative was devoted to the current year's financial performance (21%), future performance and revenues (18%) and player investment (18%). Third, as Morrow states on pages 32/33: 'Consistent with previous studies of narrative reporting, one conclusion from this evidence is that there is a tendency for selective narrative disclosure. The narrative is concentrating on information which can be reported as good news, such as improved television deals, but with little or no emphasis on equally important but less palatable information such as, for example, disproportionate increases in wages and salaries costs.' Indeed, of the 3,317 text units that were analysed only 14% were coded as negative.

In an interesting section of the report, two football clubs that have encountered financial difficulties over the last five years were investigated in more depth: Leeds United and Leicester City. In both cases, and it is a shame that this section only covers about three pages, there is what appears to be biased reporting. For example, Morrow comments on Leicester City that 'once again it is somewhat difficult to comprehend how the directors could have interpreted the club's position, performance and prospects in such a positive light at the time of preparing the narrative for the 2001 annual report' (p. 40).

Overall, Morrow's conclusion is that narrative reporting in the annual report is important but that currently the information is unbalanced and partial. He believes that auditors should express an opinion on the process that has been followed in drawing up the narratives.

Overall, therefore, I found this research report interesting. It adds to the general literature on impression management. However, it also should have a more general appeal to those who are interested in football more generally. As an academic I would have appreciated more detail, but as a more general reader mildly interested in football I found the report very readable.

Cardiff Business School Mike Jones

Inside G4 + 1: The working group's role in the evolution of the International Accounting Standard setting process. *Donna L. Street.* Institute of Chartered Accountants in England and Wales, 2005. xii + 127 pp.

This report concerns the work and influence of the G4 + 1 group of standard setters. The author concludes (e.g. p.109) that the G4 + 1 had a major impact on the technical work of the IASC, of several national standard-setters, and then of the IASB; that its existence was a significant part of the context of the creation of the IASB; and that it had a posthumous influence on how the members of the IASB related to each other in the IASB's early years. All this seems plausible although somewhat exaggerated, and it justifies an interest in a report on the G4 + 1.

After a brief introduction, Chapters 2 and 3 look at the origins and output of the G4 + 1. Chapters 4 to 6 summarise the views of 11 former participants in G4 + 1 on the relationship between G4 + 1 and the IASC; on the 'rewarding' and 'frustrating' aspect of their participation in G4 + 1; and on the structure and operations of the IASB. Chapter 7 is entitled 'Summary and Conclusions'.

The report's title (see above) suggests that it primarily looks at the evolution of the standard setting 'process', but more of the report's content is about the evolution of particular standards. Its author explains (pp.3/4) that the report is primarily raw material (the accounts of interviewees), and that it does not provide a comprehensive analysis of the environment. Quoting others, she notes (p. 4) that 'Opportunities present themselves to use such accounts on a discerning basis in critical investigations of accounting institutions'. There *were* opportunities here to produce finished goods from the raw material, but they were not taken. For example, academic readers might regret that the history is not put into a theoretical framework. Also, the obvious historical analogy with the International Accountants' Study Group (AISG) is not even mentioned, let alone analysed. The AISG was set up in 1966 by representatives from Canada, the UK and the US and it published technical studies that formed the basis of some of the early work of the IASC; it was wound up after the IASC was formed. The G4 + 1 was set up in 1992 by representatives from the same three countries (later joined by Australia and then New Zealand) and it published technical studies that formed the basis of some of the late work of the IASC and the early work of the IASB; it was wound up after IASB was formed.

The content of the report's core chapters (2 to 4) is not exactly raw material but semi-processed: interview material is joined by other information. Value could have been added by providing a table of titles and dates of G4 + 1 reports and a table of meeting dates, locations and attendees. Then, to test the author's suggestion of strong G4 + 1 influence, the list of G4 + 1 output could have been correlated with the subsequent output of the G4 + 1 members. For example, by my count, of the 12 documents of the G4 + 1 only four related to subsequent IASC standards and only two to IASB standards. Looking at it the other way round, most of the IASC/B standards of 1995 to 2005 were not preceded by related G4 + 1 papers.

When choosing authors for histories or even collations of interviews, a compromise needs to be struck between achieving (i) sufficient distance from a subject to ensure objectivity, and (ii) not so much distance that the author does not understand the subject sufficiently to correct for the interviewees' false recollections or biases. In this case, the distance may have been too great. Such a problem can be mitigated by getting drafts checked by experts who are closer to the subject, but the author of this report does not acknowledge any assistance beyond that relating to the interviews.

As an example of confusion on an organisational issue, when the report discusses the IASC, there is often no separation of (i) the board members (mostly accountancy bodies), (ii) the countries of the Board members, (iii) the representatives of the members (i.e. the people with votes at Board meetings), and (iv) the staff (e.g. the Secretary General). So: (a) Contrary to a remark on page 11, standard setters invited to join the G4 + 1 would not necessarily have been committed to the IASC's *Framework* because, for many countries, the standard setters were not involved with the IASC. (b) Which of the above four saw G4 + 1 as a threat? (p.11). (c) When 'IASC did not like it at all' (p.19) that Tweedie was appointed as G4 + 1 chairman, does that perhaps mean a few representatives from some continental European countries? (d) We are told (p.61) that the Institute of Chartered Accountants of [*sic*] England and Wales (ICAEW) was 'eventually convinced' to appoint David Tweedie to its delegation at the IASC Board. (The author gets the name of her sponsor and publisher wrong here; a small point but symptomatic of an approach to facts.) However, there was no such thing as an ICAEW delegation. The UK delegation was appointed by several accountancy bodies and, when a vacancy arose in 1995, it was considered to be the Scottish Institute's turn to propose a name. I do not believe that that Institute (or the ICAEW) was opposed to the appointment of its most famous member.

There are also examples of technical muddle. This is at its worst on financial instruments: (i) In consecutive sentences (p.26), we are told that the IASC's Draft Statement of Principles (DSOP) (1997) proposed a full fair value model, then that IAS 39 was approved in 1998. However, IAS 39 does not have a full fair value model, so what is the connection? And, incidentally, the IASC document was not a DSOP but one step earlier: a 'discussion paper' (DP), published jointly with the Canadian Board. (ii) Then we are told (p.27) that the UK ASB's paper of 1996 proposed full fair value; and immediately afterwards that FRED 30 proposed to adopt IAS 39 in the UK. However, these two points have nothing to do with each other because, again, IAS 39 is a long way from full fair value. (iii) It is reported (p.27) that the Australians welcomed the DSOP (presumably the DP) and then that they passed AASB 139, a standard exactly like IAS 39. Again, these are contradictory points because AASB 139 is not at all based on the DP. (iv) Later, we are told (p.56) that the IASC Board voted in late 1997 not to adopt US standards on financial instruments but to proceed towards a full fair value model. However, how does that fit with the fact that, shortly afterwards, the IASC's E62 and then IAS 39 (both of 1998) were squarely based on US standards and are nothing like the DP? In fact the Board agreed to both a short-term condensation of the US standards and a medium-term son-of-DP (to be prepared by the Financial Instruments Joint Working Group of Standard Setters).

Most of these points on IAS 39 appear in the report's section about the G4 + 1's paper on hedging (of 1995). However, the G4 + 1 could not agree about hedging. So, the real issue is that they could agree that derivatives should be marked to market, and that this conclusion finds its way into later standards, including IAS 39. Interestingly, the draughtsman of all the drafts of IAS 39 says[1] that he has never read the G4 + 1 paper on hedging, so any influence must have come via the US standard, SFAS 133, and its 1996 exposure draft.

Some of the above confusion might have come from the faulty memories of the interviewees, but this does not justify retailing it all on to us. Fortunately, the general story of the technical achievements of the G4 + 1 still comes through.

The final two chapters of the report are curious. Chapter 6 is about the perceptions of the 11 interviewees on the IASB's structure. This material is only indirectly related to the G4 + 1. Then Chapter 7 (of 11 pages) is said to be 'Summary and Conclusions', but the majority of it is about political pressure on IASB, especially concerning IAS 39 (five pages), about recent criticisms of the Framework (one page) and about the IASCF Constitution (one page). These topics are all post-G4 + 1 and not closely connected to it.

In conclusion, the report is written in a readable style, but not within a theoretical context or a full historical one, as it explains. Its facts are not organised in an easy way for reference. In some areas, the admittedly complicated story should have been disentangled for us but is confused further. However, there is nowhere else for readers to go to find this level of detail on the G4 + 1, a body that the author shows, with some exaggeration, to have been of major significance.

University of Reading Christopher Nobes

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[1] Letter to me from Paul Pacter, 18.8.05. I am grateful to Paul Pacter for comments on a draft of this review.

Journal of Business Finance & Accounting

June/July 2005 Vol. 32 Nos 5 & 6

Contents

The Long Run Abnormal Performance of UK Acquirers and the Free Cash Flow Hypothesis
by ALAN GREGORY

The Impact on UK Acquirers of Domestic, Cross-border, Public and Private Acquisitions
by ROBERT L. CONN, ANDY COSH, PAUL M. GUEST AND ALAN HUGHES

Investment Opportunity Set and Voluntary Disclosure of Prospective Information: A Simultaneous Equations Approach
by MAHMUD HOSSAIN, KAMRAN AHMED AND JAYNE M. GODFREY

Incentive Effects, Monitoring Mechanisms and the Market for Corporate Control: An Analysis of the Factors Affecting Public to Private Transactions in the UK
by CHARLIE WEIR, DAVID LAING AND MIKE WRIGHT

The Wealth Effects of Capital Investment Decisions: An Empirical Comparison of Korean *Chaebol* and Non-*Chaebol* Firms
by WI SAENG KIM, ESMERALDA LYN, TAE-JUN PARK AND EDWARD ZYCHOWICZ

The International Transmission of Arbitrage Information Across Futures Markets
by CHRIS BILSON, TIM BRAILSFORD AND TWM EVANS

An Investigation of the Impact of Interest Rates and Interest Rate Volatility on Australian Financial Sector Stock Return Distributions
by ROBERT W. FAFF, ALLAN HODGSON AND MICHAEL L. KREMMER

Excess Volatility and UK Investment Trusts
by SAMUEL AGYEI-AMPOMAH AND J. R. DAVIES

The Effect of Decimalization on Trade Size and Adverse Selection Costs
by SUGATO CHAKRAVARTY, BONNIE F. VAN NESS AND ROBERT A. VAN NESS

Employee Relations and the Likelihood of Occurrence of Corporate Financial Distress
by GREGORY D. KANE, UMA VELURY AND BERNADETTE M. RUF

International Publishing Patterns: An Investigation of Leading UK and US Accounting and Finance Journals
by MICHAEL JOHN JONES AND ROYDON ROBERTS

***FRS17* and the Sterling Double A Corporate Yield Curve**
by FRANK S. SKINNER AND MICHALIS IOANNIDES

Determinants of the Accounting Change for Income Tax
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Journal of Business Finance & Accounting

November/December 2005 Vol. 32 Nos 9 & 10

Contents

Intangible Assets, Information Complexity, and Analysts' Earnings Forecasts
by Feng Gu and Weimin Wang

The Impact of Managing Director Changes and Financial Distress on Audit Qualification and Auditor Switching
by Mohammad Hudaib and T.E. Cooke

Are Unsolicited Credit Ratings Lower? International Evidence From Bank Ratings
by Winnie P.H. Poon and Michael Firth

Relationship Between Analyst Forecast Properties and Equity Bid-Ask Spreads and Depths Around Quarterly Earnings Announcements
by Kiridaran Kanagaretnam, Gerald J. Lobo and Dennis J. Whalen

Information Asymmetry and the Bid-Ask Spread: Evidence From the UK
by Andros Gregoriou, Christos Ioannidis and Len Skerratt

The Law of Proportionate Effect: The Growth of the UK Credit Union Movement at National and Regional Level
by Ann-Marie Ward and Donal G. McKillop

The 'Independence' of Expert Opinions in Corporate Takeovers: Agreeing With Directors' Recommendations
by Martin Bugeja

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by Wei Zhang, Steven F. Cahan and Arthur C. Allen

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by Richard Bozec

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by John C. Topuz, Ali F. Darrat and Roger M. Shelor

A New Application of Sustainable Growth: A Multi-Dimensional Framework for Evaluating the Long Run Performance of Bank Mergers
by Gerard T. Olson and Michael S. Pagano

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Contents Index

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Tippett, M. and Whittington, G. (1995). 'An empirical evaluation of an induced theory of financial ratios'. *Accounting and Business Research*, 25: 208–218.

Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory*. Englewood Cliffs, NJ: Prentice-Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelled with an 's' not a 'z'. Single quotation marks should be used, not double.

Mathematical notation

Mathematical notation should be used only where it adds rigour and precision, and should be properly explained in the text. Equations should be numbered in parentheses, flush with the right-hand margin.

Accounting and Business Research

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Deprival value and fair value: a reinterpretation and a reconciliation

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Accounting and Business Research
Volume 36 Number 2 2006

Contents

Editorial 63

Articles

A new method for ranking academic journals in accounting and finance — Vivien Beattie, Alan Goodacre 65

Investigating the return predictability of changes in corporate borrowing — Edward Lee, Konstantinos Stathopoulos, Mark Hon 93

An empirical investigation of 'closeness to cash' as a determinant of earnings response coefficients — Gnanakumar Visvanathan 109

Deprival value and fair value: a reinterpretation and a reconciliation — Tony van Zijl, Geoffrey Whittington 121

Book Review

Cristiano Busco, Mark Frigo, Elena Giovannoni, Angelo Riccaboni and Robert Scapens. *The role of performance measurement systems within global organisations* — Laura F. Spira 131

Forthcoming Articles

Brian G. M. Main, The ABI guidelines for share-based incentive schemes: setting the hurdle too high?

Begoña Giner and Raul Iñiguez, An empirical assessment of the Feltham-Ohlson models considering the sign of abnormal earnings

Holger Daske, Günther Gebhardt and Stuart McLeay, The distribution of earnings relative to targets in the European Union

K. P. McMeeking, K. V. Peasnell and P. F. Pope, The determinants of the UK Big Firm premium

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Farewell

Accounting and Business Research came into being in 1970. There have been four editorial regimes in the ensuing years. The founding editor, Walter Taplin, handed over the reins to Bob Parker in 1975, who later shared the task with Chris Nobes. Ken Peasnell took over in 1993 and appointed two associate editors, Mahmoud Ezzamel and Peter Moizer, to share the load. Thirteen busy years have passed, and it is now time for us to make way for a new editor.

From its foundation, *Accounting and Business Research* has always been a broad church, publishing research drawing on different areas of accounting, research traditions and methodologies. Our editorial experience over the past 13 years has taught us that accounting researchers need to be aware of what is going on in other parts of the discipline. We believe that the journal has contributed to this process.

The outgoing editors are particularly pleased to be handing over to Pauline Weetman of the University of Strathclyde, who we know shares our vision of the journal and will continue its broad focus. From now on, all new manuscripts should be submitted electronically to abr@cch.co.uk. All correspondence on manuscripts in process should be submitted to Pauline.

Finally, we would like to express our thanks to Freda Widders for the administrative support she has provided over the years. Without her calm efficiency, the journal would not be where it is today.

Ken Peasnell
Mahmoud Ezzamel
Peter Moizer

A word from the new editor

I very much appreciate being invited to take on the editorship of this highly-regarded journal, which has contributed inestimably to the development of accounting thought and practice over many years. Ken Peasnell, with the support of Mahmoud Ezzamel and Peter Moizer and a strong editorial board, has maintained a tradition of supporting research that makes a substantial and original contribution to knowledge in a style that is rigorous while remaining intelligible to a wide-ranging readership of academics and interested practitioners.

Accounting and Business Research will continue to publish research of high quality, drawing on the expertise of reviewers of international standing. There are no preconceptions of the methodological stance or method of research investigation. Accounting is seen in its widest sense. We are interested in papers that contribute to improving our understanding of the core disciplines of accounting (financial reporting, management accounting, financial management, auditing, accounting information systems, taxation, etc), and work that links accounting to its purposes and functions (e.g. corporate governance, economics of information, behavioural and societal issues). Research also aims to look beyond national boundaries and beyond existing professional practice in developing new thinking. It is for the authors of papers to explain clearly how they see the contribution of their research relating to the editorial policy of the journal.

I look forward to receiving well-prepared submissions from authors who feel that their research has a significant contribution to knowledge that should be published to a wide readership. I am grateful to the editorial board for their continuing support and I am working with the publishers, Wolters Kluwer (UK) Ltd, to ensure that submission to the journal and access for readers will provide the best opportunities to contribute to, and enjoy reading, *Accounting and Business Research*.

Accounting and Business Research, Vol. 36. No. 2. pp. 65-91. 2006

A new method for ranking academic journals in accounting and finance

Vivien Beattie and Alan Goodacre*

Abstract—Given the many and varied uses to which journal rankings are put, interest in ranking journal 'quality' is likely to persist. Unfortunately, existing methods of constructing such rankings all have inherent limitations. This paper proposes a new (complementary) approach, based on submissions to RAE 2001, which is not restricted to a pre-defined journal set and, importantly, is based on quality choice decisions driven by economic incentives. For three metrics, submissions to RAE 2001 are compared with the available set of publications to provide evidence on the perception of journal quality, a fourth metric is based on the overall RAE grades, and an overall ranking is produced.

1. Introduction

The importance of academic journal articles as a form of scholarly output has resulted in academics devoting a great deal of effort towards the creation of journal rankings. Four approaches to the development of journal rankings have emerged: citation studies, perception studies and, more recently, 'market-test' studies and internet downloading frequency studies. Each of the approaches has limitations. Citation studies depend on the assumption that a citation is an objective indicator of influence. Although most citation studies make use of the *Social Sciences Citation Index (SSCI)*, the number of accounting and finance journals covered by this index is extremely limited, with many major outlets (for non-US academics) not included. Perception studies (also termed peer-review or opinion survey studies) appear to have been the dominant approach used in the accounting discipline. Typically, respondents are asked to assign points to each journal identified by the study, based on its 'value', 'familiarity' and/or 'quality'. However, perception studies may suffer from inherent biases such as a pre-disposition towards journals in which respondents publish. The market-test is based on an analysis of library holdings but may reflect economic circumstances or random factors unrelated to journal quality. The download method suffers from faculty bias in posting working papers.

The objective of this paper is to use the submissions to the most recently completed UK research assessment exercise (RAE) in a novel way to assess relative journal quality. The 2001 RAE required university 'units of assessment' (departments or other groupings of researchers) to identify research-active staff and to submit up to four research outputs for each, as an indicator of the quality of research undertaken. Units of assessment (UoAs) were graded into seven quality bands: 1, 2, 3a, 3b, 4, 5, and 5* (for further details see Otley, 2002). As research funding depended on the overall grade awarded, UoAs had significant economic incentives to select what they believed the peer review group (the RAE panel members) would view as the best research.

The working methods of each RAE panel differed slightly, but all the research outputs of accounting and finance researchers were assessed by the Accounting and Finance panel.[1] The published criteria and working methods of this panel state that, in assessing research quality, it will 'collectively examine in detail at least one cited item per member of staff' (RAE, 1999: §3.35.32). Items not examined were judged, *inter alia*, on 'evidence of peer review' (RAE, 1999: §3.35.34). The chair of the panel explained that, while 'the current system places considerable reliance, quite properly, on the refereeing processes of academic journals' it is 'hazardous to rely solely on publications in journals deemed to be of high quality as a research as-

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*The authors are respectively Professor of Accounting (University of Glasgow) and Professor of Accounting and Finance (University of Stirling). They would like to thank the Faculty of Management, University of Stirling, for the award of a research grant to fund this project and Joanne Lello and Damien Snedden, in particular, for their assistance with data collection. Special thanks go to Elizabeth Davie for her advice and assistance in designing the Access database. The authors also wish to thank the editor, Ken Peasnell and two anonymous reviewers for their helpful and constructive comments on an earlier draft of this paper. Correspondence should be addressed to Alan Goodacre, Department of Accounting and Finance, University of Stirling, Stirling FK9 4LA, UK. E-mail: Alan.Goodacre@stir.ac.uk

This paper was accepted in February 2006.

[1] The outputs were either submitted directly or were cross-referred from another panel (see Section 3).

ssment tool', as 'the quality of articles within the
vers of any single journal can vary considerably
quality' (Otley, 2002: 401). This indicates clear-
that the panel itself did *not* make use of journal
kings. However, to the extent that research
ality and journal quality are correlated, econom-
-related decisions impounded in the RAE sub-
ssions can be used to proxy relative journal
ality. These rankings, which are proxy measures
the overall rigour and quality of a journal's con-
t and peer review processes, can be used for a
riety of purposes. For example, they are useful
guiding authors' decisions about where to sub-
t a paper and in benchmarking research produc-
ity for individual promotion decisions and for
titutional evaluation purposes.

The paper contributes by applying methods
ich improve on prior journal ranking studies in
ur ways. First, the study ranks journals that are
greater relevance to non-US accounting and fi-
nce academics than citation methods which typ-
lly deal with a small number of US-based
rnals. Second, the ranked journals are not con-
ained to a relatively small pre-determined list of
tential journals; the ranked set of journals com-
ises all those containing papers considered suffi-
ntly meritorious for submission to RAE 2001.
ird, the rankings are based on choices which
d significant economic implications for those
king the decisions, a major advantage over all
thods adopted previously in the accounting and
ance discipline. Fourth, in contrast to studies
ich have used RAE 2001 to rank journals in
er disciplines, a comparison is made between
pers *published* by the 'research-active' academ-
during the period and papers that they *submit-*
l to RAE 2001. The consideration of papers that
re, by implication, judged of 'inferior' quality
pands the variability of the available data and
reby improves the potential for discrimination.
ally, and perhaps most importantly, while the
thods adopted here have limitations they are
ferent to those present in all other methods that
ve been used to rank journal quality. Our main
ntribution can, therefore, be seen as providing
angulation for these alternative methods.

our metrics are proposed based on the submis-
n choices made in RAE 2001. Using informa-
n from research-active individuals' quality
cisions, two rankings are based on pairwise
mparisons between journals (one at the individ-
researcher level; the other at the aggregate
el). Comparison between publications and sub-
ssions underpins the third 'submission to publi-
ion ratio' measure. The fourth measure involves
calculation of a weighted average RAE grade
AE metric) based on the RAE 2001 peer review
el judgments. The three aggregate metrics are
mbined to produce an overall ranking. Strong
correlations are observed between rankings based on the different journal quality proxies and also with recent survey studies. However, a large number of submissions to RAE 2001 were from journals excluded from survey studies, reflecting the diversity of interests of the UK accounting and finance community. Thus, the paper provides a timely analysis of relative journal quality across a wide number of journals of direct relevance to non-US academics.

The remainder of this paper is structured as follows. Section 2 briefly reviews the prior literature on the ranking of accounting and finance journals. The third section sets out the methods applied, focusing particularly on the linkage between the two databases providing the input data. Results are provided in Section 4, followed by a concluding section discussing the relevance and limitations of the results.

2. Prior literature

Given the pre-eminent position of academic journal articles as a form of scholarly output (Parker et al., 1998), it is not surprising that academics have devoted a great deal of effort towards the creation of journal rankings. Two main approaches have emerged based on citation analysis and on peer review perceptions. More recently, two further approaches have been reported based on the analysis of library holdings and on electronic paper downloads via the internet. All approaches have to rely on proxies for the underlying, but unobservable, construct of interest which is journal quality. The number of journals ranked in these studies varies enormously (although it has increased over time as the number of journals has increased). Each of these approaches is outlined below; however, only a brief summary of research using the two main approaches is provided, as there are several good reviews of this literature (e.g., Brown and Gardner, 1985; Hull and Wright, 1990; Brown and Huefner, 1994; and Jones et al., 1996).

Many citation studies make use of the *Social Sciences Citation Index (SSCI)*. The basic idea is that a citation is an objective indicator of influence. Proponents of this approach argue that it is an objective, value-free, evaluative technique (Brown and Gardner, 1985). However, Jones et al. (1996) suggest three main lines of criticism that have arisen. First, inconsistent rankings have been found, depending on the particular measures adopted. Second, there are 'technical problems' that may obscure the link between citation and quality. An obvious problem is that a citation might be negative, but others are more subtle. For example, authors cite papers that will enhance the likelihood of publication, such as those authored by potential referees and journal editors. Also, citations may be biased in favour of: popular authors who enjoy a 'halo effect'; review papers; methodological papers; or established researchers (Brown and Huefner, 1994). Third, and perhaps most problematically, the number of accounting and finance journals covered by the SSCI is limited, with many major outlets (for non-US academics) not included. Of the 44 accounting and finance journals listed in the most recent UK peer review-based ranking (Brinn et al., 1996), only nine were listed in SSCI. In their study of the finance discipline, Chan et al. (2000) note that just 18 out of the 60 journals in Heck's (1996) *Finance Literature Index* were included in SSCI. To overcome this limitation, they had to resort to manual collection of citation statistics for their ranking of 59 journals. To provide some context for this limitation, it may be noted that 143 different finance journals were included in respondents' lists of 'top 20' journals in Oltheten et al. (2005). Similarly, UK accounting and finance academics published in 126 different accounting and finance academic journals in the two year period 1998–9 (Beattie and Goodacre, 2004) but only 21 of these journals (17%) are abstracted in the SSCI.

Perception studies typically ask respondents to rank a provided list of journals based on 'value', 'familiarity' and/or 'quality'. Of the two recent UK studies one evaluates 44 accounting and finance journals (Brinn et al., 1996) and the other 32 accounting journals (Lowe and Locke, 2005). A recent international study investigates the ranking of 58 named journals (Ballas and Theoharakis, 2003). Such studies typically overcome many of the limitations of citation studies but suffer from their own limitations related to the use of survey methods. In particular, they suffer from 'technical problems' such as non-response bias (responses from non-respondents may differ from those obtained), sample representation bias (the sampled groups may not be representative of the entire population), and position bias (journal placement in the survey questionnaire may bias responses) (Brown and Huefner, 1994). Responses may also suffer from self-serving predisposition bias towards different journals, particularly those in which the respondent either publishes or acts as reviewer/editor. Importantly, such studies are necessarily subjective as they rely on human judgment.

The market-test is based on an analysis of library holdings. Bertin et al. (1994) rank 62 journals using the holdings of 264 schools. Zeff (1996) reports on subscriptions to 67 accounting journals by twelve major libraries (located in the US, the UK and Australia), identifying three modal groups across the grading of journals. These gradings are interpreted as quality rankings by Wilkinson and Durden (1998) and Durden et al. (1999) and used by them to construct weighted measures of productivity of accounting faculty in New Zealand and Australia, respectively. Locke and Lowe (2002) replicate Zeff's analysis for all 46 universities in Australia and New Zealand, with the intention of constructing a set of journal rankings of relevance to authors from that region; they find a 'good deal of disparity' between their results and Zeff's journal gradings.

The advent of electronic versions of papers available for downloading from the internet provides another avenue for assessing journal quality. Two early illustrations of the potential of this approach use the download frequency of heavily downloaded working papers from the *Social Science Research Network (SSRN)*. The first ranks the journals in which the papers were subsequently published (Brown, 2003), while the second ranks PhD programmes and faculties (Brown and Laksmana, 2003). The download frequency is used to provide the measure of 'impact', and by inference a measure of journal and or faculty-member 'quality'. Brown identifies three advantages of such an approach. It is demand-driven at the micro-level, it potentially includes any/all journals that faculty might publish in, and it allows the academic community to register their views before the gatekeepers (editors and reviewers) decide what should be published. Limitations of the procedure are that downloaded papers may not actually be read, low quality papers by popular authors, or papers on hot topics may be more heavily downloaded, and authors can bias the measure by frequently downloading their own papers. Another issue identified by Brown (2003) is that there is a faculty bias in posting working papers, with financial faculty more likely to post their working papers to SSRN. However, the procedure appears to produce similar rankings to other studies and download frequencies are found to be positively related to citation frequencies.

While many journal ranking studies appear content to treat the measures obtained (using any approach) unproblematically as interval level measures, some writers have chosen instead to classify the measures into broad ordinal categories. Gray and Helliar (1994) establish two journal groups based on refereeing policy: premier journals (of which there were 40) which are always refereed, and secondary journals (of which there were 39) which are predominantly academic but not always refereed or where the refereeing policy is unclear. Brown and Huefner (1994), in a perceptions study of 44 accounting journals using US respondents, refer to 'three thresholds of quality'. Zeff (1996) identifies three modal groupings from his study of library holdings. Hickman and Shrader (2000) create three quality groupings out of the 71 finance journals listed in Heck's *Finance Literature Index*, making use of Alexander and Mabry's (1994) citation-based quality ratings.

Hasselback et al. (2000) create four groups in their study of productivity benchmarks for accounting faculty by using cluster analysis: the best 4, the best 12, the best 22 and the best 40. This ordinal grouping approach has the advantage of not suggesting spurious accuracy in the ranking measures although inevitably a boundary problem exists for those journals at the margins.

Prior research using different methods over quite a long time period has identified a very small number of top journals with remarkable consistency. However, the quality of the large number of remaining journals, those in which most research by most academics is likely to be published, is not well-determined. In part, this might reflect variable research quality within each particular journal, variations over time, or perhaps local factors within different geographic regions. However, it also reflects the difficulty that researchers experience in assessing quality using the approaches outlined above. The current research contributes by adopting a novel approach that has advantages over prior methods. Specifically, the approach is not constrained to a limited pre-identified set of journals and is informed by economic incentives.

3. Methods

Members of the UK accounting and finance academic community are based either in departments within traditional faculties (or schools), often representing a loose grouping of management-type disciplines, or within more integrated business schools. Universities were able to choose whether to include research-active staff from the community within the specific 'Accounting and Finance' (hereafter A&F) unit of assessment or within the broader, and larger, 'Business and Management' (hereafter B&M) unit of assessment. If included within B&M, accounting and finance researchers were cross-referred to the A&F panel for advice to improve the consistency of quality assessment (Otley, 2002). Universities were free to identify which of their staff should be submitted as research-active, such staff contributed to the RAE grade achieved and attracted (to the university) the research funding which was allocated on the basis of RAE 2001. Staff whom universities identified as non-research-active were excluded from the RAE ranking process and attracted no research funds.[2]

Each research-active member of staff was allowed to submit up to four publications for quality assessment by the peer review panel; the census period for publications covered the five complete calendar years 1996 through 2000. The restricted population of research-active staff and their four 'best' publications were identified from the RA2 submissions made to the two relevant panels of peer-reviewers (A&F, and B&M), available from the RAE 2001 web-site (RAE, 2001). The full population of publications available for submission in the census period was identified from the three relevant biennial British Accounting Review Research Registers (Helliar and Gray, 1998, 2000; Helliar et al., 2002).[3] Staff from the accounting and finance community (defined as those included in at least one of the three registers) were matched with those submitted to RAE 2001 as research-active, thereby screening out of the community those defined (in RAE terms) as non-research-active.

Although the total number of articles from a particular journal that was submitted to RAE 2001 is interesting in its own right and is reported in the present paper, this measure gives a poor indication of perceived quality. Some journals, particularly US-based ones, are not easily accessible to UK academics for reasons unrelated to journal quality. A stronger indication of quality can be obtained from the comparative choices actually made, by comparing the submitted subset in relation to the available set of publications. This comparison can be made at two levels, the individual staff member level and the aggregate population of submitted staff.

Metric 1: Individual pairwise comparisons

First, at the individual staff member level, a procedure to capture the micro 'quality' decision-making process was adopted. For this, a large number of pairwise comparisons was made to identify how often a paper in a given journal was chosen in preference to papers in other journals, with the preferred paper implied to be of higher quality. For example, if a paper from journal A is submitted to RAE 2001 by a particular researcher but one from journal B is not, the implication, *ceteris paribus*, is that A is perceived as a higher quality piece of work; this suggests that journal A is of higher quality. In later reported results, this is termed a 'win' for journal A and a 'loss' for journal B. If an individual researcher has 6 items available for submission (i.e. four selected and two not), then differential quality inferences can be made in relation to eight pairwise comparisons (it is not possible to distinguish between the four selected items). Such pairwise comparisons provide, for each researcher and then in aggregate, a tally of the number of times a particular journal is preferred (wins) over each of the other (non-submitted) journals.

---

[2] It was possible for a university to trade off the rank obtained with the number of staff submitted. For example, a unit that believed itself to be on the borderline between 4 and 5 might choose to omit some staff of national (rather than international) excellence in the hope of obtaining the 5 rank. If successful, it would obtain the higher funding rate (unknown ex ante) associated with the 5, but multiplied by the lower number of staff submitted. The university would presumably make this decision based on the expected overall funding (Otley, 2002). This means that some genuinely 'research-active' staff may have been omitted from the RAE 2001 process; these staff have also been excluded from our analysis.

[3] Having worked with the BAA Research Registers previously, our priors were that they represent a reasonably accurate record of output by the A&F community. Some errors we have been able to correct in constructing the database, though some will remain. To assess the accuracy of our Registers' database, we manually checked all of the papers from the 63 journals with five or more submissions to RAE 2001 (i.e. those in Tables 4 to 7) against entries in the Registers. Of the 1,032 papers, 854 (82.8%) papers were included within the Registers. 88 (8.5%) were papers that had been published by individuals prior to their entry into the A&F community; these researchers had perhaps moved to the UK from abroad, or moved into an A&F group from another discipline. Sixteen (1.6%) papers were submitted to RAE 2001 twice by the same individual (so were included once in the database but twice in RAE 2001). 74 (7.2%) papers were omitted from the Registers in error. In a large majority of cases these related to researchers who had moved between institutions and the publication had not been recorded by either institution. The rest presumably relate to inaccurate recording by the researcher or reporting by the institution. Thus, our best estimate of the actual error rate in the Registers is 7.2%.

This information can be used to produce a ranking of journals using the transitivity principle; i.e. if journal A > B and journal B > C, this implies journal A > C. Detailed analysis of this type can be used to construct a rank order of journals. Specifically, a summary matrix of pairwise comparisons was produced and then refined manually by changing the rank order iteratively to minimise the number of inconsistent cells (win/loss reversals) in the table; these inconsistencies indicate situations where the transitivity principle breaks down. Inconsistencies close to the diagonal were removed first as these removals were less likely to create further inconsistencies. Changing those further from the diagonal typically produced more inconsistencies than were resolved. While it is impossible to eradicate all inconsistencies, the ranking is likely to be a good approximation based on the relatively noisy data (see also footnote 14). An advantage of the approach adopted is that the ranking avoids the use of other metrics used in the present paper, so can be viewed as having a degree of independence. Conceptually, the approach is perhaps the strongest of those used. However, in practice there were only a small number of pairwise comparisons available for many journals, so the method had to be restricted to a relatively small set of journals. While these were the more 'popular' and, therefore, also important journals as far as the UK accounting and finance community is concerned, other metrics with wider applicability were also used.

Metric 2: Aggregate pairwise comparisons

The second method, while still based on pairwise comparisons, avoids the difficulty with the first method by combining the comparisons into an aggregate measure. An overall preference ratio based on the total number of wins and losses for papers from each journal was calculated:

$$\text{Preference ratio} = \frac{\text{no of wins}}{\text{total no of comparisons}} = \frac{\text{no of wins}}{\text{no of wins + no of losses}}$$

This aggregate preference ratio gives an overall indication of the accounting and finance community's views about the relative quality of papers in each journal. A high preference ratio suggests that the journal is clearly favoured by the community. A limitation of this metric is that no distinction is made between wins over high or low quality journals; each win (or loss) is ranked equally.

The two metrics presented thus far involve a comparison between each researcher's available publications and those submitted to RAE 2001. It should be recognised that both of these metrics are unable to take into account various 'game playing' strategies that might have been adopted by individual UoAs.[4] For example, suppose that researcher A had several high quality papers jointly authored with less experienced staff. The UoA had to decide the optimal allocation of the jointly-authored papers between the co-authors. Given that the A&F panel had indicated in its published working methods that it did not expect the same paper to be submitted more than once by the same UoA, the UoA might have considered it optimal to 'allocate' one or more of the papers to a less-experienced researcher (B) to boost his/her profile of publications. This might have enabled extra researchers to be included as research-active or might have contributed to an overall increase in the ranking achieved by the UoA, resulting in positive economic consequences in both cases.

The effect of this rational behaviour is to introduce a limitation to the present study. The observation related to researcher A is adversely affected, in that the 'allocated' high quality publication will be deemed inferior to those (from other journals) actually submitted by researcher A. Given that it is not possible to adjust for this within the research design, it is important to consider the likely impact of this limitation. Assuming that the effect is random across high quality journals, the impact will be neutral across these journals though some noise will be introduced. Nonetheless, it will serve to reduce the differences observed between high quality and lower quality journals, in effect a form of symmetric 'mean-reversion'. However, there is no reason to expect that any systematic asymmetric bias will be introduced to the rankings. It is important to note that the remaining two metrics do not suffer from this limitation.

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[4] The choice of one article over another is presumed to be based on perceptions of relative journal quality. However, it might also be based on other factors such as a lengthy contribution being preferred to a shorter note or comment, or an article based on empirical data or a novel method of data analysis being preferred to a more discursive piece.

Metric 3: Aggregate submission to publication ratio

Third, based on aggregate rather than individual staff level comparisons, comparative choice was measured by calculating the percentage of the entire set of publications by research-active staff in a particular journal that was actually submitted to RAE 2001.[5] A journal for which a higher percentage of the available publications was submitted implies a perception of higher quality. For this metric, 'allocation' of a paper to a joint author has no impact as the paper is included in the 'submitted' count for the journal.

Metric 4: Weighted average RAE grade (RAE metric)

A fourth ranking metric was based on the overall RAE 2001 grades awarded to UoAs. These were used to calculate a weighted average grade (RAE metric) of UoAs submitting papers from each journal.[6] A journal with relatively more submissions by higher rated UoAs suggests higher quality papers therein, so a higher quality journal. The metric is defined as:

$$\text{RAE metric}_j = \frac{\sum_{i=1}^{7} sub_{ij} \times RAE\,grade_i}{\sum \text{sub}_{ij}}$$

where:

sub_{ij} = total number of submissions from journal j to RAE 2001 for UoAs with transformed grade: RAE grade_i

RAE grade_i = transformed UoA RAE 2001 grade ranging from i = 1 – 7 (i.e. ranks 1–5*)

For example, there were 64 submissions from ***Accounting and Business Research*** to RAE 2001 ($\sum \text{sub}_{ij} = 64$). Of these, the number of submissions from UoAs graded 1 through 7 were, respectively, 0, 0, 2, 2, 7, 37, 16 (see row 2, Table 2, later). Thus, the weighted average RAE grade (RAE metric) of UoAs submitting papers from the journal equals 6.0, calculated as:

$$\text{RAE metric} = \frac{(0 \times 1) + (0 \times 2) + (2 \times 3) + (2 \times 4) + (7 \times 5) + (37 \times 6) + (16 \times 7)}{64} = \frac{383}{64}$$

For this metric, the research quality difference between adjacent RAE grades is implicitly assumed, somewhat arbitrarily, to be equal. This was not the view taken by the funding bodies when allocating research funds to UoAs on the basis of RAE 2001. For departments in England and Wales, the Higher Education Funding Council awarded research funds according to the ratios 2.707: 1.89 : 1: 0.305 for UoAs graded 5*, 5, 4 and 3a (transformed ranks 7, 6, 5, 4) respectively with no funds awarded to those graded 3b, 2 or 1 (transformed ranks 3, 2 ,1) (p. 415, Otley, 2002).[7] Consequently, a second ranking metric was investigated, similar to RAE metric, in which greater weight was given to papers from more highly ranked UoAs reflecting the relative 'worth' attached to the research used by funders in allocating research funds. This could be viewed as somewhat similar to the 'money-weighted return' measure in financial management. However, the ranking using this second metric was almost identical to that obtained using RAE metric (Spearman correlation = 0.992) so is not separately reported.

To ensure that there are at least a moderate number of data points on which to base inferences, only journals with a combined total of five or more submissions to A&F and B&M panels in RAE 2001 are analysed and reported for metrics 2 through 4.[8] The RAE metric is reported based on submissions to each panel separately and combined, with the combined score used to rank the journals. The merging of the RAE grades produced by the separate panels into a single combined measure is not without problem. First, the grade awarded by the B&M panel related to a relatively large and diverse group of constituents reflected in the typical business school. Thus the link to the contribution by members of the accounting and finance community is less strong than for submissions to the A&F panel. Second, the average grade awarded by the two panels differed. For example, for the 63 journals in Tables 4–7, the mean RAE grade (metric 4) is 5.98 for the A&F panel, 5.37 for

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[5] As indicated in footnote 3 above, every submission from the main journals (those analysed in Tables 4–7) was checked against the BAR Research Registers. Overall, 17.2% of submissions were, for one reason or another, not included in the Registers. The omission rate was lower for journals that had a large number of submissions to RAE 2001; e.g. for journals with 15 or more submissions it was 12.1%. For metric 3 (aggregate submission/publication rate) calculations, the total number of available publications from each journal has been increased to take account of these omissions.

[6] A similar measure has been adopted for other related disciplines: business and management (Geary, Marriott and Rowlinson, 2004); retailing (Dawson et al., 2004); and marketing (Easton and Easton, 2003). In the latter study the authors describe the measure using the term 'RAE Implied Journal Quality' (RIJQ); the Cusum Index they report in Table 5 produces an identical ranking to the measures reported in Geary et al. and in the current study.

[7] For UoAs in Scotland the equivalent ratios (starting at 5*) were not dissimilar at 3.2; 2.8; 1.55; 1; 0; 0; 0 (Otley, 2002).

[8] The studies of RAE-based journal rankings in other related disciplines focused on journals with a minimum frequency of three (Geary et al., 2004) or six (Easton and Easton, 2003; Dawson et al., 2004).

Table 1
Summary statistics of research-active staff

Panel A
Research-active staff submitted to either A&F or B&M panel (per RAE 2001)

RAE 2001 grade				Number of outputs (per RA2)[2]		
Original	Transformed	No of staff	No of inst[1]	Academic journal papers	Others	Total
1	1	13	3	20	27	47
2	2	172	15	441	182	623
3b	3	279	18	851	176	1027
3a	4	568	25	1694	401	2095
4	5	752	26	2310	427	2737
5	6	793	25	2388	541	2929
5*	7	348	5	948	347	1295
		2925	117	8652	2101	10753

Panel B
Research-active staff submitted from A&F community to either A&F or B&M panel (per BAR research registers)

RAE 2001 grade				Number of outputs (per RA2)[2]		
Original	Transformed	No of staff	No of inst[1]	Academic journal papers	Others	Total
1	1	0	0	0	0	0
2	2	6	4	19	3	22
3b	3	32	13	100	19	119
3a	4	53	15	158	35	193
4	5	126	19	401	57	458
5	6	186	23	573	107	680
5*	7	122	5	326	108	434
		525	79	1577	329	1906

Notes:
1. Strictly this represents the number of separate submissions by institutions, as submissions by the same institution to the A&F and B&M panels are counted twice.
2. Full credit is given to the submitted individual for jointly-authored publications.

B&M and 5.62 overall. However, this should not, in itself, affect the combination as long as the relative ranking of journals is similar across the two panels. For metric 4, the rank correlation between the A&F panel and the overall rank used in Table 6 is high. For example, for all journals with at least two submissions to the A&F panel (n = 43) the correlation is 0.81 and for journals with at least three submissions (n = 27) it is 0.91. Thus, there is good evidence to suggest that the combination of panels is not introducing significant bias into the rankings.

Third, there is an implicit assumption that all work in a (say) 5-rated department is of the same high standard. This is clearly not the case, as the criterion for awarding a 5 was between 10–50% of the work submitted should be of 'international' quality, so a significant proportion of the research output was of lower quality. Again, it can be argued that this will introduce noise, rather than bias, to the results.[9]

Finally, to summarise the overall picture emerging for the common set of journals from the use of the three aggregate metrics, an overall rank is computed based on the simple mean of the ranks from the three. Each of the three proxies has different advantages and limitations and none of them is clearly dominant, so the use of a simple mean rank, while somewhat arbitrary, does not seem unreasonable.

4. Results

Background statistics

Table 1 provides summary statistics about research-active staff submitted to either the A&F or B&M peer-review panel of RAE 2001. It reports the number of staff and the number of outputs submitted, analysed by the ranking obtained in the RAE (1 to 5*, transformed into rank 1–7) and the type of output.

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[9] We are grateful to one of the reviewers for highlighting these two limitations.

Panel A shows that publications for 2,925 research-active staff were included in 117 institution submissions; 8,652 items of output were journal papers and 2,101 were other forms of output such as book chapters, discussion papers etc. Panel B repeats this information for the subset of staff from the 'accounting and finance community' as defined by entry in at least one of the three relevant Research Registers. Thus 525 of the total 2,925 research-active staff, from 79 different institution submissions,[10] were listed in at least one of the registers, and 1,577 academic journal papers were submitted for these staff.[11]

Submission statistics by journal

Table 2 reports the frequency with which papers from each journal were submitted by research-active staff from the accounting and finance community to RAE 2001, analysed by RAE grade. Panel A shows the 30 (including ties) most frequently submitted journals, ordered by total number of submissions. Panel B shows the distribution of submission numbers across all submitted journals. As might be expected, the submission numbers are negatively skewed with a large tail of single submissions (217 journals). The number of journals comprising 50% of the submissions is 26 overall, but with greater concentration in the A&F panel (17 journals) than the B&M panel (29 journals). As might be expected from our focus on the accounting and finance community, the journals most frequently submitted to the two panels were generally very similar, with nine of the top 10 common to both panels, albeit with different proportions of submissions.

The data in Table 2 provide an initial opportunity to identify which journals appear to be highly regarded by high ranking research UoAs. For example, six journals achieve 10 or more submissions by rank 7 (5*) departments: *Journal of Business Finance and Accounting*, *Accounting and Business Research*, *Accounting Organizations and Society*, *Journal of Banking and Finance*, *Journal of Finance* and *Research in Financial Studies*.

Metric 1: Individual pairwise comparisons

A journal which published a paper that was not submitted by a research-active individual to RAE 2001 can, *ceteris paribus*, be inferred to be of lesser quality than the journals which published the papers that he/she did submit. For each pair of journals in this comparison, one wins (submitted paper) and one loses (not submitted). Table 3 summarises the results of this comparison for 18 of the 19 most frequently submitted journals[12] in a matrix indicating the number of wins and losses for each pairwise comparison. For example, the intersection of the *British Accounting Review* row and *Journal of Business Finance and Accounting* column shows 21 wins for *Journal of Business Finance and Accounting* over *British Accounting Review* and 8 losses. Overall, papers in *Journal of Business Finance and Accounting* were perceived as of higher quality than papers in *British Accounting Review* by those submitting to RAE 2001. A blank win/loss cell (e.g. *Accounting Organizations and Society/Applied Financial Economics*) implies that no direct comparison between the journals is possible since no researcher submitted a paper from either journal to RAE 2001 and also had published papers in the other journal available for submission. However, the transitivity principle was used to produce a ranking of journals where no direct comparison exists. For example, since *Accounting Organizations and Society* is preferred to *Journal of Business Finance and Accounting* (4 wins, 0 losses) and *Journal of Business Finance and Accounting* is preferred to *Applied Financial Economics* (15 wins, 2 losses), *Accounting Organizations and Society* can be inferred as superior to *Applied Financial Economics*.

After an initial ranking of journals, a summary matrix in the style of Table 3 was produced. Reading down each column, cells below the diagonal should show net wins for the column journal since the column journal is ranked higher than the row journals; conversely, cells above the diagonal should show net losses for the column journal. The ranking was then refined manually by trial and error to minimise the number of inconsistent cells (win/loss reversals) in the table. For example the comparison between *Financial Accountability and Management* and *Accounting and Business Research* shows 4 wins and 0 losses for *Financial Accountability and Management*, suggesting that

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[10] At three institutions (Durham, Edinburgh and Manchester Universities), some of the accounting and finance community staff were submitted to the A&F and some to the B&M panel, so the number of different institutions is 76.

[11] Analysis of this summary across the two separate RAE panels shows that, overall, output for 225 (2700) research active staff from 20 (97) different institutions was submitted to the A&F (B&M) peer-review panel. 677 (7975) items of output were journal papers and 134 (1967) were other forms of output such as book chapters, discussion papers etc. For the A&F panel, 204 (91%) of the total 225 research active staff were from the accounting and finance community; the remaining 21 (9%) were mainly economists who were included within submissions from certain institutions. For the B&M panel, 321 (11.9%) staff were from the 'accounting and finance community' and submitted 959 journal papers to RAE 2001.

[12] The *Journal of Finance* is excluded from this analysis as there were almost no direct comparisons available between *Journal of Finance* and other journals in the table. The 12 individuals from the A&F community with RAE 2001 submissions from *Journal of Finance* tended to publish in other journals not readily accessible to UK researchers.

Table 2
Summary of academic journal papers submitted to RAE 2001 by research-active staff from the accounting and finance community

Panel A: The most frequently submitted journals

		Total number of journal submissions to RAE 2001 by staff in UoAs with transformed grade =							
Rank	**Journal**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**% of all journal papers submitted**
1	Journal of Business Finance and Accounting	0	5	3	22	66	26	122	7.74%
2	Accounting and Business Research	0	2	2	7	37	16	64	4.06%
3	Accounting Auditing and Accountability Journal	1	0	3	21	26	7	58	3.68%
4	British Accounting Review	1	4	6	18	21	6	56	3.55%
5	Critical Perspectives on Accounting	0	0	2	20	20	6	48	3.04%
6	Management Accounting Research	0	1	4	13	20	9	47	2.98%
7	Accounting Organizations and Society	0	0	0	4	21	16	41	2.60%
8	European Accounting Review	0	4	0	10	15	7	36	2.28%
9	Financial Accountability and Management	0	1	8	10	13	0	32	2.03%
10	Journal of Banking and Finance	0	0	2	9	11	10	32	2.03%
11	Accounting Education	0	3	5	7	8	0	23	1.46%
12	Accounting Business and Financial History	0	0	1	3	11	7	22	1.40%
13	Applied Financial Economics	0	0	7	10	4	1	22	1.40%
14	European Journal of Finance	0	1	2	12	4	3	22	1.40%
15	Journal of Finance	0	0	1	1	3	13	18	1.14%
16	European Financial Management	0	0	1	4	6	6	17	1.08%
17	Journal of Futures Markets	1	1	0	6	2	7	17	1.08%
18	International Journal of Auditing	0	0	3	6	4	2	15	0.95%
19	Journal of Applied Accounting Research	1	2	4	5	2	0	14	0.89%
20	Manchester School of Economic and Social Studies	0	0	1	5	7	1	14	0.89%
21	British Journal of Management	1	1	0	9	1	1	13	0.82%
22	Corporate Governance: An International Review	1	3	3	2	4	0	13	0.82%
23	Journal of International Money and Finance	0	0	1	4	2	6	13	0.82%
24	Review of Financial Studies	0	0	0	0	0	12	12	0.76%

Table 2
Summary of academic journal papers submitted to RAE 2001 by research-active staff from the accounting and finance community (continued)

Panel A: The most frequently submitted journals (continued)

Rank	Journal	**Total number of journal submissions to RAE 2001 by staff in UoAs with transformed grade =**							
Rank	**Journal**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**% of all journal papers submitted**
25	International Journal of Accounting	0	2	1	3	4	1	11	0.70%
26	Journal of Financial Regulation and Compliance	0	0	2	7	2	0	11	0.70%
27	Accounting Forum	0	1	1	3	4	1	10	0.63%
28	Accounting History	0	1	1	1	4	3	10	0.63%
29	British Tax Review	0	1	1	1	4	2	9	0.57%
30	Journal of the Operational Research Society	0	1	0	7	1	0	9	0.57%
31	Organization	0	0	0	2	5	2	9	0.57%
Totals (including journals not listed above)		**19**	**100**	**158**	**401**	**573**	**326**	**1577**	**100%**
Total number of different journals		**18**	**68**	**100**	**155**	**190**	**128**	**408**	

Panel B: Distribution of journal submission numbers

	Number of journals with submissions totalling	**freq**	**%**	**Cum freq**	**Cum %**
	>50	4	1.0%	4	1.0%
	31–50	6	1.5%	10	2.5%
	21–30	4	1.0%	14	3.4%
	11–20	12	2.9%	26	6.4%
	6–10	24	5.9%	50	12.3%
	3–5	66	16.2%	116	28.4%
	2	75	18.4%	191	46.8%
	1	217	53.2%	408	100.0%
Total		**408**	**100.0%**		

Financial Accountability and Management should rank higher than *Accounting and Business Research.* However, placing *Financial Accountability and Management* above *Accounting and Business Research* violates the implied superiority of five journals (*Accounting, Auditing and Accountability Journal*, *Journal of Business Finance and Accounting*, *Critical Perspectives on Accounting*, *Accounting, Business and Financial History* and *Management Accounting Research*) over *Financial Accountability and Management*; i.e. solving one inconsistency produces five more![13] While some such inconsistencies remain in Table 3 (win/loss reversals indicated by emboldened figures in cells),[14] and the solution may not be unique, the ranking is consistent with alternative determinations.[15]

The next three tables summarise the rankings of a much larger set of 63 journals (i.e., those with at least five submissions to RAE 2001) using three different metrics. Papers submitted to RAE 2001 from these 63 journals comprise 1,032 (65%) of the total 1,577 journal paper submissions. The inclusion of more journals in the ranking set increases the potential relevance of the analysis but at the cost of reduced reliability. Caution needs to be exercised in attributing too much weight to evidence based on a small number of observations. Using the classification in Beattie and Goodacre (2004), over a third (23) of the 63 journals are classified as non-core journals, covering mainly economics and management disciplines; this reflects the diversity of output from the accounting and finance community previously identified (Beattie and Goodacre, 2004).

Metric 2: Aggregate pairwise comparisons

Table 4 summarises the pairwise comparisons in an alternative aggregated form. It shows the total number of times a journal was preferred over any other journals (wins) and the total number of times it was not (losses). The table is ranked on the aggregate preference ratio of wins/losses. In this analysis, seven journals with low submissions are ranked top; these include four outside mainstream accounting and finance as well as three that have been consistently ranked highly in prior studies (*Journal of Accounting Research*, *Journal of Financial and Quantitative Analysis* and *Journal of Financial Economics*). The *Journal of Finance* ranks next, marginally above the *Journal of International Money and Finance*, followed by *Accounting Organizations and Society* and the *Journal of Banking and Finance*. The top six in the previous analysis maintain their high rankings (here 10, 11, 13, 15–17) but the relative rankings of *Accounting, Business and Financial History* and *European Financial Management* decline to 39 and 41, respectively. The *Review of Financial Studies* fares less well (ranking 31) than suggested by its association with RAE 7-graded UoAs reported earlier in Table 2.

Metric 3: Aggregate submission to publication ratio

This metric is based on the expectation that a large proportion of the available papers from journals perceived to be of high quality (assumed to include high quality papers) would be submitted to RAE 2001; lower proportions would be expected for lower quality journals. This suggests a correlation between journal quality and the proportion of available papers submitted. Table 5 reports the number of papers from each journal submitted to RAE 2001 and the total number of papers published in that journal by the same research-active staff over the same 1996–2000 period based on listings in the *British Accounting Review* Research Registers. The publication numbers have been adjusted for all RAE submissions that had been omitted from the Registers. This data allows the submission to publication ratio to be calculated.

In Panel A of Table 5 the 63 journals are ranked on the total combined aggregate RAE submission to publication ratio (penultimate column), with the

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[13] The explanation for this observation is that the *Accounting and Business Research* papers were jointly authored with others at the same institution and were 'allocated' to one of the other authors to improve the institution's overall quality of papers submitted to RAE 2001.

[14] There are a three further inconsistencies (not emboldened in the matrix) that relate to pairwise comparison high-score 'draws' (i.e. equal number of wins and losses). All three involve the *European Accounting Review*: with *Accounting, Auditing and Accountability Journal* (six wins and six losses), with *Critical Perspectives on Accounting* and with *Management Accounting Research* (both three wins and three losses). These suggest a wide variation in perception of the quality of papers in *European Accounting Review*. The positive and negative inconsistencies in the *International Journal of Auditing* comparisons also suggest a wide variation in perception.

[15] An alternative approach to ranking based on these pairwise comparisons can be undertaken by treating each comparison as the result of a game between the two, analogous to a soccer game. Continuing the soccer analogy enables a league table to be constructed based on the results for each team (journal). Various points systems were assessed and a modified version of the current UK soccer league system was considered reasonable. It seemed important to recognise that a score draw (e.g. Win 1 Loss 1) conveyed greater information than a no-score draw (which implies no comparisons between two journals were available). So a table was constructed based on the following: overall win = 3 points; 'score' draw = 2 point; 'no-score' draw = 1 point; loss = 0 points). In this league table, the *Journal of Banking and Finance* came marginally top with 40 points (11 wins; 1 'score' draw; 5 'no-score' draws; and a win/loss (goal) difference of +32), closely followed by *Accounting and Business Research* on 39 points (W 11; SD 3; NSD 0; WL diff +29) and *Accounting Organizations and Society* with 37 points (W 10; SD 0; NSD 7; WL diff +33). The marginally changed ranking reflects the additional information which is aggregated within the league measures and the reduced emphasis on the results of individual 'games' between the top teams (journals). Overall, the ranking was similar to that reported in Table 3 (Spearman correlation = 0.924) with a maximum rank change of ±4.

Table 3
Ranking based on metric 1: individual pairwise comparisons

		AOS		JBF		JFutM		ABR		AAAJ		JBFA	
	rank	W	L	W	L	W	L	W	L	W	L	W	L
Accounting Organizations and Society	1			0	0	0	0	1	3	7	9	0	4
Journal of Banking and Finance	2	0	0			0	1	0	2	1	1	2	7
Journal of Futures Markets	3	0	0	1	0			1	1	0	0	2	4
Accounting and Business Research	4	3	1	2	0	1	1			3	4	12	13
Accounting Auditing and Accountability J	5	9	7	1	1	0	0	4	3			1	3
Journal of Business Finance and Accounting	6	4	0	7	2	4	2	13	12	3	1		
Critical Perspectives on Accounting	7	9	3	1	0	0	0	3	0	16	14	3	1
Management Accounting Research	8	6	1	0	0	0	0	5	3	10	8	3	2
Accounting Business and Financial History	9	3	0	1	0	0	0	1	1	5	0	**1**	**2**
Financial Accountability and Management	10	3	0	1	0	0	0	**0**	**4**	6	5	1	0
European Financial Management	11	0	0	4	1	5	2	3	2	0	0	10	4
British Accounting Review	12	4	0	2	0	**0**	**1**	9	2	7	4	21	8
International Journal of Auditing	13	3	1	0	0	0	0	1	1	6	1	1	0
European Accounting Review	14	4	2	0	0	0	0	8	3	6	6	7	0
Applied Financial Economics	15	0	0	11	0	4	0	2	0	0	0	15	2
Accounting Education	16	0	0	2	0	0	0	8	0	5	0	1	0
European Journal of Finance	17	0	0	3	0	4	1	5	0	0	0	13	1
Journal of Applied Accounting Research	18	0	0	0	0	0	0	2	0	3	0	2	0

Notes:
1. W (L) = win (loss) for column journal over row journal. Win means that a paper from the particular journal was submitted in preference to an available paper from the other journal.
2. Emboldened figures in cells indicate that the pairwise comparison result is inconsistent with the relative ranking of the two journals indicated by the row/column intersection.
3. The information to the right of the diagonal is the transpose of that to the left, so can be considered redundant. However, it is retained in the table to aid appreciation of the ranking for each particular (columnar) journal.

journal ranking from a recent UK perception survey (Brinn et al., 1996) included in the final column for comparison. There are seven journals for which 100% of the available papers were submitted to RAE 2001. This group includes the *Journal of Financial and Quantitative Analysis*, *Journal of Accounting Research*, *Accounting and Business Research* and *Journal of Financial Economics*. The *Journal of Finance* ranks next with a ratio of 95%. All of these were rated highly in the Brinn et al. (1986) survey. The top 20 journals include eight finance journals plus the *Journal of Business Finance and Accounting*, six of which were not included in the Brinn et al. survey, including some relatively new journals. This implies that some journals seem able to establish a high reputation very quickly and confirms the need for regular reappraisal of relative journal quality. Of the remaining 11 journals in the top 20, three are accounting and eight are non-core economics and management journals. The inclusion of nine finance, but only three accounting, journals in this top group may reflect the fact that finance journals are more accessible to UK staff, in view of the globalisation of markets; by contrast, accounting remains a more local discipline (Lukka and Kasanen, 1996).

The next 15 journals, in the submission to publication ratio range down to 65%, include four that would be regarded as core 'quality' journals for the accounting and finance community. Several more core journals are observed with ratios above 55%. The relatively low rating for *Critical Perspectives*

CPA		MAR		ABFH		FAM		EFM		BAR		IJAud		EAR		AFE		Aed		EJOF		JAppAR	
W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L
3	9	1	6	0	3	0	3	0	0	0	4	1	3	2	4	0	0	0	0	0	0	0	0
0	1	0	0	0	1	0	1	1	4	0	2	0	0	0	0	0	11	0	2	0	3	0	0
0	0	0	0	0	0	0	0	2	5	**1**	**0**	0	0	0	0	0	4	0	0	1	4	0	0
0	3	3	5	1	1	**4**	**0**	2	3	2	9	1	1	3	8	0	2	0	8	0	5	0	2
14	16	8	10	0	5	5	6	0	0	4	7	1	6	6	6	0	0	0	5	0	0	0	3
1	3	2	3	**2**	**1**	0	1	4	10	8	21	0	1	0	7	2	15	0	1	1	13	0	2
		1	4	0	3	2	6	0	0	4	5	**3**	**2**	3	3	**1**	**0**	0	5	0	0	0	9
4	1			0	1	0	9	0	0	5	6	**4**	**0**	3	3	0	0	2	5	0	1	0	4
3	0	1	0			0	1	0	0	1	2	0	2	**2**	**1**	**1**	**0**	0	0	0	0	0	0
6	2	9	0	1	0			0	0	4	5	0	2	0	4	0	0	1	4	0	0	0	0
0	0	0	0	0	0	0	0			0	1	0	0	0	1	0	1	0	0	0	2	0	0
5	4	6	5	2	1	5	4	1	0			1	3	4	5	0	2	3	4	3	4	1	5
2	**3**	**0**	**4**	2	0	2	0	0	0	3	1			2	2	0	0	**1**	**0**	0	0	**1**	**0**
3	3	3	3	**1**	**2**	4	0	1	0	5	4	2	2			0	0	0	2	0	1	0	0
0	**1**	0	0	**0**	**1**	0	0	1	0	2	0	0	0	0	0			0	1	1	3	0	0
5	0	5	2	0	0	4	1	0	0	4	3	**0**	**1**	2	0	1	0			0	0	0	1
0	0	1	0	0	0	0	0	2	0	4	3	0	0	1	0	3	1	0	0			0	2
9	0	4	0	0	0	0	0	0	0	5	1	**0**	**1**	0	0	0	0	1	0	2	0		

on Accounting may result partially from the inclusion of very short items (such as poems) in the available publications lists,[16] also, perhaps certain staff publish relatively frequently in this specialist journal so not all could be submitted to RAE 2001. Ten journals have a submission to publication ratio of 50% or less.

Panel B of Table 5 repeats the above analysis for those journals ranked in the Brinn et al. (1996) survey for which less than five papers were submitted to RAE 2001. This is included for completeness but should be interpreted with particular caution, given the small number of observations. It is important to note that all of the nine journals with submission to publication ratios of 100% are based in the US or Canada, indicating the relative infrequency with which UK-based academics publish in these journals (Brinn et al., 2001). A further five journals ranked in Brinn et al. (1996) do not feature in either Panel A or Panel B as no papers were submitted to RAE 2001 by staff from the accounting and finance community. The omitted journals (with Brinn et al. (1996) ranks in brackets) are: *Accounting Review* (5); *Journal of Accounting Literature* (13); *Behavioral Research in Accounting* (20); *Advances in Accounting* (23); *Accounting and Finance* (41).

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[16] Unfortunately, it was not possible based on the available publications database to separate out such minor 'publications' for *Critical Perspectives on Accounting* or for other journals which feature such items.

Table 4
Ranking based on metric 2: aggregate pairwise comparisons (preference ratio)

Rank	**Journal**[1,2]	**wins**[3]	**losses**[3]	**pref ratio**	***nosubs***
1	Academy of Management Journal	27	0	1.000	*7*
1	Journal of Accounting Research	12	0	1.000	*5*
1	Journal of Financial and Quantitative Analysis	6	0	1.000	*5*
1	Journal of Financial Economics	5	0	1.000	*6*
1	European Journal of Operational Research	3	0	1.000	*5*
1	Review of Economic Studies	3	0	1.000	*5*
1	Journal of the Operational Research Society	2	0	1.000	*9*
8	Journal of Finance	18	2	0.900	*18*
9	Journal of International Money and Finance	14	2	0.875	*13*
10	Accounting Organizations and Society	70	19	0.787	*41*
11	Journal of Banking and Finance	55	15	0.786	*32*
12	Economic History Review	13	4	0.765	*5*
13	Journal of Futures Markets	26	11	0.703	*17*
14	Human Relations	7	3	0.700	*6*
15	Accounting and Business Research	120	57	0.678	*64*
16	Accounting Auditing and Accountability Journal	121	65	0.651	*58*
17	Journal of Business Finance and Accounting	143	80	0.641	*122*
18	Journal of International Accounting, Auditing and Taxation	26	16	0.619	*5*
19	Manchester School of Economic and Social Studies	17	11	0.607	*14*
20	International Journal of Accounting	18	12	0.600	*11*
20	Abacus	15	10	0.600	*7*
22	International Journal of Finance and Economics	13	9	0.591	*8*
23	Journal of Management Studies	11	8	0.579	*6*
24	European Finance Review	4	3	0.571	*5*
25	Economics Letters	17	13	0.567	*6*
26	Journal of International Financial Management and Accounting	20	16	0.556	*8*
27	Critical Perspectives on Accounting	81	67	0.547	*48*
28	Journal of Empirical Finance	6	5	0.545	*8*
29	Management Accounting Research	57	50	0.533	*47*
30	Financial Accountability and Management	49	45	0.521	*32*
31	Business History	11	11	0.500	*6*
31	Review of Financial Studies	6	6	0.500	*12*
31	Organization Studies	5	5	0.500	*5*
34	British Accounting Review	81	90	0.474	*56*
35	Organization	4	5	0.444	*9*
36	European Accounting Review	44	57	0.436	*36*
37	Economic Journal	3	4	0.429	*6*
38	International Journal of Auditing	21	31	0.404	*15*
39	Accounting Business and Financial History	18	29	0.383	*22*
40	British Journal of Management	17	30	0.362	*13*
41	European Financial Management	17	31	0.354	*17*
42	Accounting History	15	31	0.326	*10*
43	Accounting Historians Journal	5	11	0.313	*7*

Table 4
Ranking based on metric 2: aggregate pairwise comparisons (preference ratio) (continued)

Rank	Journal[1,2]	wins[3]	losses[3]	pref ratio	*nosubs*
44	Managerial Finance	4	10	0.286	*5*
45	Corporate Governance: An International Review	15	40	0.273	*13*
46	Applied Financial Economics	17	47	0.266	*22*
47	Omega: International Journal of Management Science	4	14	0.222	*5*
47	International Journal of Information Management	2	7	0.222	*6*
49	Applied Economics	3	11	0.214	*7*
49	Managerial Auditing Journal	3	11	0.214	*7*
51	Journal of Financial Regulation and Compliance	7	26	0.212	*11*
52	European Journal of Finance	12	47	0.203	*22*
53	British Tax Review	5	20	0.200	*9*
53	Journal of Economic Dynamics and Control	1	4	0.200	*6*
55	Accounting Education	10	50	0.167	*23*
55	Journal of Applied Accounting Research	7	35	0.167	*14*
57	Long Range Planning	3	16	0.158	*6*
58	Irish Accounting Review	5	27	0.156	*5*
59	European Business Review	1	8	0.111	*6*
60	Accounting Forum	2	39	0.049	*10*
61	Public Money and Management	2	51	0.038	*8*
62	International Journal of Technology Management	0	2	0.000	1
–	European Economic Review[4]	0	0	n/a	*5*

Notes:
1. Table includes all journals with at least five submissions to RAE 2001 and is ordered on aggregate preference ratio.
2. The table only compares journals included therein; it does not summarise all wins/losses for a journal.
3. Win = a paper from the journal was submitted in preference to an available paper from another journal. Loss = a paper from another journal was submitted in preference to one available from the journal.
4. No ranking is possible for European Economic Review as no comparisons are available.

Metric 4: Weighted average RAE grade (RAE metric)

Table 6 reports the ranking of the 63 journals based on the RAE 2001 grades. The RAE metric (weighted average RAE grade) is calculated for each journal using the total number of submissions from UoAs as weights; Columns 2, 5 and 8 show the mean RAE grade based on submissions to the A&F panel, B&M panel and combined results. To enable a judgment on the strength of the evidence, the number of submissions (*no subs*) on which each ranking is based is reported in columns 3, 6 and 10. The ranking of some journals based on submissions to the separate panels is either not possible (no submissions) or needs to be treated with utmost caution given the very small number of submissions. The overall results are based on a minimum of five submissions. The overall median RAE grade is reported in column 9 and the final column reports the overall rank based on combined submissions. For the 63 journals in Table 6, the mean RAE metric is 5.98 for the A&F panel, 5.37 for B&M and 5.62 overall.[17]

Consider first the overall results (columns 8 to 11). All of the submissions to RAE 2001 for the top three journals (*Journal of Accounting Research*, *Review of Economic Studies*, and *Review of Financial Studies*) came from UoAs ranked 7 (5*) by the peer review panels, so they achieve a RAE metric of 7.0. The next three journals (*Journal of Financial Economics*, *Journal of Finance* and *Economic Journal*) came predominantly from UoAs ranked 7, so achieve RAE metrics in the top group (RAE metric >6.5). It is worth noting that three of the top six journals are in the finance area, two are in economics with only one in accounting. The next group (relating to UoA trans-

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[17] As a benchmark, for the full set of journal paper submissions by the accounting and finance community, the mean RAE grade (metric 4) was 5.97 for the A&F panel, 5.22 for B&M and 5.51 overall.

Table 5
Ranking based on metric 3: aggregate submission to publication ratio

Panel A: Journals with five or more submissions to RAE 2001

		Journal papers submitted to RAE 2001 panel[1]			Publications over period by research-active staff[2]			Aggregate submission to publication ratio (%)			
Rank	**Journal[4]**	**A&F**	**B&M**	**Combined**	**A&F**	**B&M**	**Combined**	**A&F**	**B&M**	**Combined**	**BJP96 rank[3]**
1	Journal of Financial and Quantitative Analysis	3	2	5	3	2	5	100%	100%	100%	2
1	Journal of Accounting Research	3	2	5	3	2	5	100%	100%	100%	4
1	Accounting and Business Research	29	35	64	29	35	64	100%	100%	100%	11
1	Economic History Review	1	4	5	1	4	5	100%	100%	100%	nr
1	European Economic Review	1	4	5	1	4	5	100%	100%	100%	nr
1	Journal of Financial Economics	0	6	6	0	6	6	na	100%	100%	nr
1	Journal of the Operational Research Society	1	8	9	1	8	9	100%	100%	100%	nr
8	Journal of Finance	5	13	18	5	14	19	100%	93%	95%	1
9	Journal of Futures Markets	5	12	17	6	13	19	83%	92%	89%	nr
10	Journal of Banking and Finance	6	26	32	8	28	36	75%	93%	89%	nr
10	Journal of Empirical Finance	5	3	8	6	3	9	83%	100%	89%	nr
12	Academy of Management Journal	2	5	7	2	6	8	100%	83%	88%	nr
13	Economic Journal	4	2	6	5	2	7	80%	100%	86%	nr
13	Human Relations	2	4	6	2	5	7	100%	80%	86%	nr
13	International Journal of Information Management	0	6	6	0	7	7	na	86%	86%	nr
13	Review of Financial Studies	3	9	12	3	11	14	100%	82%	86%	nr
17	European Finance Review	1	4	5	2	4	6	50%	100%	83%	nr
17	Review of Economic Studies	5	0	5	6	0	6	83%	na	83%	nr
19	Journal of Business Finance and Accounting	66	56	122	73	77	150	90%	73%	81%	10
20	Accounting Organizations and Society	24	17	41	28	24	52	86%	71%	79%	6
21	Abacus	3	4	7	4	5	9	75%	80%	78%	21
21	Accounting Historians Journal	6	1	7	6	3	9	100%	33%	78%	27
21	Manchester School of Economic and Social Studies	9	5	14	10	8	18	90%	63%	78%	nr
24	Journal of International Money and Finance	4	9	13	6	11	17	67%	82%	76%	nr
25	Organization	2	7	9	5	7	12	40%	100%	75%	nr
26	Accounting Auditing and Accountability Journal	31	27	58	41	40	81	76%	68%	72%	26
27	Managerial Finance	2	3	5	4	3	7	50%	100%	71%	43
27	European Journal of Operational Research	3	2	5	4	3	7	75%	67%	71%	nr
27	International Journal of Technology Management	2	3	5	3	4	7	67%	75%	71%	nr
30	Management Accounting Research	23	24	47	35	31	66	66%	77%	71%	18
31	British Accounting Review	24	32	56	37	43	80	65%	74%	70%	28
31	Applied Economics	0	7	7	0	10	10	na	70%	70%	nr

Table 5
Ranking based on metric 3: aggregate submission to publication ratio (continued)

Panel A: Journals with five or more submissions to RAE 2001 (continued)

		Journal papers submitted to RAE 2001 panel[1]			Publications over period by research-active staff[2]			Aggregate submission to publication ratio (%)			
Rank	**Journal[4]**	**A&F**	**B&M**	**Combined**	**A&F**	**B&M**	**Combined**	**A&F**	**B&M**	**Combined**	**BJP96 rank[3]**
33	International Journal of Accounting	1	10	11	3	13	16	33%	77%	69%	30
34	Financial Accountability and Management	8	24	32	15	33	48	53%	73%	67%	17
34	Business History	0	6	6	2	7	9	na	86%	67%	22
34	International Journal of Finance and Economics	7	1	8	9	3	12	78%	33%	67%	nr
34	Journal of Economic Dynamics and Control	2	4	6	3	6	9	67%	67%	67%	nr
34	Journal of Management Studies	0	6	6	1	8	9	na	75%	67%	nr
39	Journal of Int'l Accounting, Auditing and Taxation	4	1	5	5	3	8	80%	33%	63%	36
40	British Journal of Management	2	11	13	3	18	21	67%	61%	62%	nr
41	J of Int'l Financial Management and Accounting	6	2	8	9	4	13	67%	50%	62%	9
42	Accounting Business and Financial History	13	9	22	19	17	36	68%	53%	61%	29
43	Accounting Education	11	12	23	16	22	38	69%	55%	61%	44
44	Long Range Planning	0	6	6	1	9	10	na	67%	60%	nr
45	European Financial Management	6	11	17	14	15	29	43%	73%	59%	nr
46	Critical Perspectives on Accounting	21	27	48	35	47	82	60%	57%	59%	16
47	International Journal of Auditing	7	8	15	12	14	26	58%	57%	58%	nr
48	European Accounting Review	18	18	36	30	34	64	60%	53%	56%	38
49	Organization Studies	1	4	5	3	6	9	33%	67%	56%	nr
50	Applied Financial Economics	7	15	22	17	23	40	41%	65%	55%	nr
50	European Journal of Finance	2	20	22	9	31	40	22%	65%	55%	nr
52	British Tax Review	7	2	9	7	10	17	100%	20%	53%	39
53	Journal of Financial Regulation and Compliance	2	9	11	6	15	21	33%	60%	52%	nr
54	Economics Letters	3	3	6	5	7	12	60%	43%	50%	nr
54	European Business Review	3	3	6	5	7	12	60%	43%	50%	nr
56	Corporate Governance: An Int'l Review	3	10	13	5	22	27	60%	45%	48%	nr
57	Accounting Forum	8	2	10	16	5	21	50%	40%	48%	nr
57	Accounting History	4	6	10	11	10	21	36%	60%	48%	nr
59	Omega: Int'l Journal of Management Science	1	4	5	1	10	11	100%	40%	45%	nr
60	Journal of Applied Accounting Research	4	10	14	8	25	33	50%	40%	42%	nr
61	Irish Accounting Review	1	4	5	6	7	13	17%	57%	38%	nr
62	Managerial Auditing Journal	0	7	7	1	18	19	na	39%	37%	nr
63	Public Money and Management	0	8	8	3	21	24	na	38%	33%	42

Table 5
Ranking based on metric 3: aggregate submission to publication ratio (continued)

Panel B: Journals with less than five submissions to RAE 2001, but included in Brinn et al. (1996) ranking

	Journal papers submitted to RAE 2001 panel[1]			Publications over period by research-active staff[2]			Aggregate submission to publication ratio (%)[3]			
Journal[4]	**A&F**	**B&M**	**Combined**	**A&F**	**B&M**	**Combined**	**A&F**	**B&M**	**Combined**	**BJP96 rank[4]**
Journal of Accounting and Economics	1	1	2	1	1	2	100%	100%	100%	3
Contemporary Accounting Research	1	2	3	1	2	3	100%	100%	100%	7
Journal of Accounting and Public Policy	2	2	4	2	2	4	100%	100%	100%	8
Journal of Accounting, Auditing and Finance	0	1	1	0	1	1	na	100%	100%	12
Journal of Management Accounting Research	1	1	2	1	1	2	100%	100%	100%	14
Auditing: A Journal of Practice and Theory	0	1	1	0	1	1	na	100%	100%	15
Financial Analysts Journal	3	1	4	3	1	4	100%	100%	100%	19
Advances in Public Interest Accounting	2	0	2	2	0	2	100%	na	100%	24
Journal of Accounting Education	3	0	3	3	0	3	100%	na	100%	33
Advances in International Accounting	2	1	3	3	1	4	67%	100%	75%	35
Accounting Horizons	0	2	2	0	3	3	na	67%	67%	32
Issues in Accounting Education	0	4	4	0	6	6	na	67%	67%	34
Australian Accounting Review	1	0	1	1	1	2	100%	na	50%	31
Research in Accounting in Emerging Economies	1	1	2	2	7	9	50%	14%	22%	37
Journal of Cost Management	0	1	1	3	2	5	na	50%	20%	25
Pacific Accounting Review	1	0	1	6	6	12	17%	na	8%	40

Notes:

1. Number of papers from journal submitted to RAE 2001.
2. Number of publications in journal by research-active staff from accounting and finance community over period 1996–2000 inclusive.
   Data sourced from BAR Research Register database and adjusted for any RAE2001 submitted papers omitted therefrom (see text for details).
3. The ranking of the journal in the UK perception study by Brinn et al. (1996); nr = not included in survey for ranking.
4. Journals are ordered on combined aggregate submission/publication ratio (%); within tied ratios, based on BJP96 rank, then alphabetically.

Table 6: Ranking based on metric 4: Weighted average RAE grade (RAE metric)

	A&F panel			B&M panel			Overall			
Journal[1]	Mean[2]	*no subs*	Rank[3]	Mean[2]	*no subs*	Rank[3]	Mean[2]	Median	*no subs*	Rank
Journal of Accounting Research	7.00	*3*	1	7.00	*2*	1	7.00	7	*5*	1
Review of Economic Studies	7.00	*5*	1		*0*	nr	7.00	7	*5*	1
Review of Financial Studies	7.00	*3*	1	7.00	*9*	1	7.00	7	*12*	1
Journal of Financial Economics		*0*	nr	6.67	*6*	4	6.67	7	*6*	4
Journal of Finance	6.60	*5*	7	6.54	*13*	5	6.56	7	*18*	5
Economic Journal	6.50	*4*	10	6.50	*2*	6	6.50	6.5	*6*	6
Accounting Historians Journal	6.33	*6*	13	7.00	*1*	1	6.43	6	*7*	7
European Economic Review	7.00	*1*	1	6.25	*4*	9	6.40	6	*5*	8
European Finance Review	6.00	*1*	20	6.50	*4*	6	6.40	7	*5*	8
Journal of Empirical Finance	6.60	*5*	7	6.00	*3*	13	6.38	7	*8*	10
Business History		*0*	nr	6.33	*6*	8	6.33	6	*6*	11
Accounting Organizations and Society	6.50	*24*	10	6.00	*17*	13	6.29	6	*41*	12
Economic History Review	6.00	*1*	20	6.25	*4*	9	6.20	6	*5*	13
Journal of Financial and Quantitative Analysis	6.67	*3*	5	5.50	*2*	26	6.20	7	*5*	13
Journal of Economic Dynamics and Control	6.00	*2*	20	6.25	*4*	9	6.17	6	*6*	15
Academy of Management Journal	6.00	*2*	20	6.20	*5*	12	6.14	6	*7*	16
International Journal of Finance and Economics	6.14	*7*	18	6.00	*1*	13	6.13	6	*8*	17
Accounting Business and Financial History	6.31	*13*	14	5.78	*9*	21	6.09	6	*22*	18
Economics Letters	6.00	*3*	20	6.00	*3*	13	6.00	6	*6*	19
European Financial Management	6.17	*6*	17	5.91	*11*	19	6.00	6	*17*	19
Human Relations	6.00	*2*	20	6.00	*4*	13	6.00	6	*6*	19
Journal of International Money and Finance	6.50	*4*	10	5.78	*9*	21	6.00	6	*13*	19
Organization	6.00	*2*	20	6.00	*7*	13	6.00	6	*9*	19
Accounting and Business Research	6.24	*29*	16	5.77	*35*	23	5.98	6	*64*	24
Journal of Banking and Finance	6.00	*6*	20	5.88	*26*	20	5.91	6	*32*	25
Journal of Business Finance and Accounting	6.02	*66*	19	5.68	*56*	24	5.86	6	*122*	26
J of International Financial Mgt and Accounting	6.00	*6*	20	5.00	*2*	40	5.75	6	*8*	27
Accounting History	6.25	*4*	15	5.33	*6*	30	5.70	6	*10*	28
Management Accounting Research	5.83	*23*	38	5.54	*24*	25	5.68	6	*47*	29
Journal of Futures Markets	6.60	*5*	7	5.25	*12*	33	5.65	6	*17*	30
Critical Perspectives on Accounting	6.00	*21*	20	5.33	*27*	30	5.63	6	*48*	31
J of Int'l Accounting, Auditing and Taxation	5.75	*4*	40	5.00	*1*	40	5.60	6	*5*	32
Accounting Auditing and Accountability Journal	5.97	*31*	37	5.15	*27*	39	5.59	6	*58*	33
European Accounting Review	6.00	*18*	20	5.17	*18*	36	5.58	6	*36*	34
Manchester School of Economic and Social Studies	5.78	*9*	39	5.20	*5*	35	5.57	6	*14*	35

Table 6: Ranking based on metric 4: Weighted average RAE grade (RAE metric) (continued)

	A&F panel			B&M panel			Overall			
Journal[1]	**Mean**[2]	***no subs***	**Rank**[3]	**Mean**[2]	***no subs***	**Rank**[3]	**Mean**[2]	**Median**	***no subs***	**Rank**
British Tax Review	5.57	*7*	46	5.50	*2*	26	5.56	6	*9*	36
Abacus	6.00	*3*	20	5.00	*4*	40	5.43	6	*7*	37
Omega: International J of Management Science	6.00	*1*	20	5.25	*4*	33	5.40	5	*5*	38
Public Money and Management		*0*	nr	5.38	*8*	28	5.38	6	*8*	39
International Journal of Auditing	5.71	*7*	44	5.00	*8*	40	5.33	5	*15*	40
Accounting Forum	5.75	*8*	40	3.50	*2*	61	5.30	5.5	*10*	41
British Accounting Review	5.75	*24*	40	4.94	*32*	46	5.29	5	*56*	42
European Journal of Finance	4.50	*2*	50	5.35	*20*	29	5.27	5	*22*	43
Organization Studies	6.00	*1*	20	5.00	*4*	40	5.20	5	*5*	44
Journal of Management Studies		*0*	nr	5.17	*6*	36	5.17	5	*6*	45
Long Range Planning		*0*	nr	5.17	*6*	36	5.17	5.5	*6*	45
Financial Accountability and Management	5.38	*8*	48	5.00	*24*	40	5.09	5	*32*	47
International Journal of Accounting	3.00	*1*	54	5.30	*10*	32	5.09	5	*11*	47
European Journal of Operational Research	6.67	*3*	5	2.50	*2*	62	5.00	6	*5*	49
Journal of Financial Regulation and Compliance	6.00	*2*	20	4.78	*9*	48	5.00	5	*11*	49
Applied Financial Economics	5.29	*7*	49	4.80	*15*	47	4.95	5	*22*	51
Journal of the Operational Research Society	6.00	*1*	20	4.75	*8*	49	4.89	5	*9*	52
Accounting Education	5.73	*11*	43	4.08	*12*	57	4.87	5	*23*	53
British Journal of Management	5.50	*2*	47	4.73	*11*	50	4.85	5	*13*	54
Managerial Auditing Journal		*0*	nr	4.71	*7*	51	4.71	4	*7*	55
Irish Accounting Review	6.00	*1*	20	4.25	*4*	55	4.60	5	*5*	56
International Journal of Technology Management	4.50	*2*	50	4.33	*3*	53	4.40	4	*5*	57
Corporate Governance: An International Review	5.67	*3*	45	4.00	*10*	58	4.38	4	*13*	58
Journal of Applied Accounting Research	4.00	*4*	52	4.50	*10*	52	4.36	4.5	*14*	59
International Journal of Information Management		*0*	nr	4.17	*6*	56	4.17	3.5	*6*	60
Managerial Finance	4.00	*2*	52	4.00	*3*	58	4.00	3	*5*	61
Applied Economics		*0*	nr	3.86	*7*	60	3.86	3	*7*	62
European Business Review	3.00	*3*	54	4.33	*3*	53	3.67	3.5	*6*	63

Notes:

1. Table is ordered on overall mean RAE metric, then within tied means, alphabetically.
   Boxes mark the mid-point boundaries between grades 7 (> 6.5), 6 (5.5 – 6.5), 5 (4.5 – 5.5), and 4 (3.5 – 4.5).
2. Mean RAE metric is the weighted average RAE 2001 grade of UoAs submitting papers from each journal.
3. nr means no ranking possible as there were no submissions to the A&F (B&M) panel in RAE 2001.

formed rank 6) is the largest and comprises 30 journals including most of the major UK-based journals. Also noteworthy is the inclusion of five history-oriented journals in this second group. The final two groups relating to transformed ranks 5 and 4 contain 20 and seven journals, respectively.

Given the difference between the mean RAE grades awarded by the A&F and B&M panels, it is important to assess whether this might introduce any systematic bias into the overall ranking based on combined grades. The difference in absolute grades should not affect the combination as long as the relative ranking of journals is similar across the two panels. The rank correlation between the A&F panel rank and the overall rank was calculated based on all journals with at least a modicum of evidence (taken as at least two submissions). For journals with at least two submissions to the A&F panel (n = 43) the correlation is 0.81 and for journals with at least three submissions (n = 27) it is 0.91. This high level of correlation suggests that the combination of A&F and B&M panel grades is not introducing significant bias into the rankings.

Summary by discipline

The final analysis seeks to summarise the rankings using the three aggregate metrics in the present paper (metrics 2 through 4) and compare these with the more recent perception survey studies from the UK (Brinn et al., 1996; Lowe and Locke, 2005) and internationally (Ballas and Theoharakis, 2003; Oltheten et al., 2005). Also, in contrast with the focus of the paper thus far, it provides separate analysis for the disciplines of accounting and finance (and other related areas). Table 7 summarises the various rankings for the 63 journals, while Table 8 gives rank correlations between these.

The overall ranking of the journals, based on the mean of the three ranks in Tables 4 through 6, is reported in column 7 of Table 7. The table is split into three panels representing the major disciplines: Panel A reports 26 accounting journals; Panel B 16 finance journals; Panel C the remaining 23 non-core journals (two journals are included in both accounting and finance panels). The ranking of the journals within the separate disciplines is reported in column 8. The ranking of these same journals in the four perception studies is reported in columns 9 through 14. The original ranks reported in these studies are shown, rather than the ranks based on *only* the set of journals included in Table 7.

The perception studies ranked between 30 and 44 journals, of which approximately half had less than five submissions to RAE 2001 so are excluded from the analysis (and rankings) in the present paper. For example, Brinn et al. (1996) (Table 7: column 9) ranked 44 journals, only 23 of which feature as significant contributors to RAE 2001. Of these 23, 16 have been classified as accounting journals, three as finance, two as joint accounting and finance and two as non-core journals. The top two journals in Brinn et al. (1996) were finance-oriented (*Journal of Finance* and *Journal of Financial and Quantitative Analysis*), with *Journal of Accounting and Economics* ranked third. The latter had just two publications from the accounting and finance community in the 5 year period, both of which were submitted to RAE 2001. This means that the *Journal of Accounting Research*, ranked fourth in Brinn et al. (1996), represents the top-ranked accounting journal of significance in RAE 2001 (i.e. included in Table 7, panel A).

The present ranking of accounting journals (Panel A) is broadly similar to the ordering of the same journals in the recent survey studies of accounting journals. Two of the top four journals in the present study (*Journal of Accounting Research* and *Accounting Organizations and Society*) were the highest ranked of the mutual journals in all four accounting surveys. Similarly, the other two in the top four journals in the present study were ranked highly in the perception surveys. *Accounting and Business Research* was ranked 11th, 7th, 6th and 18th in the surveys (which translates to 5th, 3rd, 4th, and 4th of the accounting journals mutual to surveys and present study) and *Journal of Business Finance and Accounting* ranked 10th, 8th, 15th and 22nd in the accounting surveys (4th, 4th, 10th and 5th of the mutual journals). Two journals generally rank somewhat higher in the present study (*Accounting Historians Journal* and *Journal of International Accounting, Auditing and Taxation*) and three journals rank lower (*Journal of International Financial Management and Accounting*, *Critical Perspectives on Accounting* and *Financial Accountability and Management*). It is also interesting to note that European academics (Ballas and Theoharakis, 2003) rank the *European Accounting Review* and *Accounting Education* more highly than UK academics (present study and Brinn et al., 1996) but history-oriented journals lower.

For the set of finance journals (Panel B), there is even greater similarity between the rankings in the present study and the ordering in the survey of finance journals by Oltheten et al. (2005). The top four are identical (though in slightly different order) to both European and US-based rankings and none of the journals is ordered significantly differently.

Panel C indicates that four non-core journals rank within the overall top 10 of those submitted to RAE 2001 by the accounting and finance community.

In Table 8, the correlations between rankings on the four alternative metrics and the overall ranking used in the present study are all reasonably strong and statistically significant. Encouragingly, the detailed individual pairs comparison correlates strongly with the other metrics and particularly with the overall rank (coefficient = 0.96). All five

Table 7
Summary of rankings from present study and comparison with recent perception survey studies

Panel A: Accounting Journals

		Ranking based on metric number						Perception surveys					
		1	2	3	4			Accounting				Finance	
Journal[1]	*No of RAE submissions*	**indiv pairs**[2]	**agg pref ratio**[3]	**agg sub /pub**[4]	**RAE metric**[5]	**Overall rank**[6]	**Acc'g rank**	**bjp96**[7]	**UK ll05**[8]	**EUR bt03**[9]	**US bt03**[9]	**EUR ott05**[10]	**US ott05**[10]
Journal of Accounting Research	*5*		1	1	1	1	1	4	3	3	2	nr	26
Accounting and Business Research	*64*	4	15	1	24	9	2	11	7	6	18		
Accounting Organizations and Society	*41*	1	10	20	12	10	3	6	1	2	5		
Journal of Business Finance and Accounting	*122*	*6*	*17*	19	*26*	20	*4*	*10*	*8*	*15*	22	*20*	*40*
Accounting Historians Journal	*7*		43	21	7	21	5	27		36	32		
Accounting Auditing and Accountability J	*58*	5	16	26	33	23	6	26	9	7	26		
Abacus	*7*		20	21	37	27	7	21	19	11	15		
Management Accounting Research	*47*	8	29	30	29	29	8	18	11	10	29		
J of Int'l Accounting, Auditing and Taxation	*5*		18	39	32	30	9	36		37	39		
J of Int'l Financial Mgt and Accounting	*8*		*26*	41	*27*	31	*10*	*9*	*18*	*nr*	*nr*	*nr*	*nr*
Accounting Business and Financial History	*22*	9	39	42	18	33	11	29	16	33	nr		
International Journal of Accounting	*11*		20	33	47	34	12	30	29	23	30		
Critical Perspectives on Accounting	*48*	7	27	46	31	37	13	16	13	12	23		
British Accounting Review	*56*	12	34	31	42	39	14	28	24	13	27		
Financial Accountability and Management	*32*	10	30	34	47	40	15	17	20	28	nr		
European Accounting Review	*36*	14	36	48	34	41	16	38	23	4	28		
International Journal of Auditing	*15*	13	38	47	40	44	17			nr	nr		
Accounting History	*10*		42	57	28	45	18			31	nr		
British Tax Review	*9*		53	52	36	48	19	39					
Accounting Education	*23*	16	55	43	53	55	20	44	28	24	36		
J of Financial Regulation and Compliance	*11*		51	53	49	56	21						
Accounting Forum	*10*		60	57	41	57	22		30	35	nr		
Corporate Governance: An Int'l Review	*13*		45	56	58	58	23						
Managerial Auditing Journal	*7*		49	62	55	60	24						
Journal of Applied Accounting Research	*14*	18	55	60	59	61	25						
Irish Accounting Review	*5*		58	61	56	62	26						

Table 7
Summary of rankings from present study and comparison with recent perception survey studies (continued)

Panel B: Finance Journals

		Ranking based on metric number						**Perception surveys**					
		1	**2**	**3**	**4**				**Accounting**			**Finance**	
Journal[1]	*No of RAE submissions*	**indiv pairs**[2]	**agg pref ratio**[3]	**agg sub /pub**[4]	**RAE metric**[5]	**Overall rank**[6]	**Acc'g rank**	**bjp96**[7]	**UK ll05**[8]	**EUR bt03**[9]	**US bt03**[9]	**EUR ott05**[10]	**US ott05**[10]
Journal of Financial Economics	*6*		1	1	4	2	1					2	2
Journal of Financial and Quantitative Analysis	*5*		1	1	13	4	2	2				4	4
Journal of Finance	*18*		8	8	5	6	3	1				1	1
Review of Financial Studies	*12*		31	13	1	11	4					3	3
Journal of Banking and Finance	*32*	2	11	10	25	12	5					5	10
Journal of Empirical Finance	*8*		28	10	10	14	6					10	19
European Finance Review	*5*		24	17	8	15	7					12	38
Journal of International Money and Finance	*13*		9	24	19	16	8					21	32
Journal of Futures Markets	*17*	3	13	9	30	16	8					27	28
Journal of Business Finance and Accounting	*122*	*6*	*17*	19	*26*	20	*10*	*10*	*8*	*15*	22	20	*40*
International J of Finance and Economics	*8*		22	34	17	22	11						
J of Int'l Financial Mgt and Accounting	*8*		*26*	41	*27*	31	*12*	*9*	*18*	*nr*	*nr*	*nr*	*nr*
European Financial Management	*17*	11	41	45	19	38	13					19	nr
Managerial Finance	*5*		44	27	61	46	14	43					
European Journal of Finance	*22*	17	52	50	43	51	15					24	nr
Applied Financial Economics	*22*	15	46	50	51	54	16					32	nr

Table 7
Summary of rankings from present study and comparison with recent perception survey studies (continued)

Panel C: Non-core journals

		Ranking based on metric number						Perception surveys					
		1	2	3	4				Accounting			Finance	
Journal[1]	*No of RAE submissions*	**indiv pairs**[2]	**agg pref ratio**[3]	**agg sub /pub**[4]	**RAE metric**[5]	**Overall rank**[6]	**Non-core rank**	**bjp96**[7]	**UK ll05**[8]	**EUR bt03**[9]	**US bt03**[9]	**EUR ott05**[10]	**US ott05**[10]
European Economic Review	*5*		n/a	1	8	3	1						
Review of Economic Studies	*5*		1	17	1	5	2					25	25
Economic History Review	*5*		12	1	13	7	3						
Academy of Management Journal	*7*		1	12	16	8	4						
Human Relations	*6*		14	13	19	12	5						
Journal of the Operational Research Society	*9*		1	1	52	18	6						
Economic Journal	*6*		37	13	6	19	7						
Manchester School of Econ and Social Studies	*14*		19	21	35	23	8						
Business History	*6*		31	34	11	25	9	22					
European Journal of Operational Research	*5*		1	27	49	26	10						
Organization	*9*		35	25	19	28	11						
Economics Letters	*6*		25	54	19	32	12						
Journal of Management Studies	*6*		23	34	45	35	13						
Journal of Economic Dynamics and Control	*6*		53	34	15	35	13						
International Journal of Information Mgt	*6*		47	13	60	42	15						
Organization Studies	*5*		31	49	44	43	16						
British Journal of Management	*13*		40	40	54	47	17						
Applied Economics	*7*		49	31	62	49	18						
Omega: International J of Mgt Science	*5*		47	59	38	50	19						
International Journal of Technology Mgt	*5*		62	27	57	52	20						
Long Range Planning	*6*		57	44	45	52	20						
Public Money and Management	*8*		61	63	39	59	22	42					
European Business Review	*6*		59	54	63	63	23						

Notes: (1) Journals in italics are classified as both accounting and finance and, therefore, are shown in both panels A and B, (2) Source: Table 3 present study; 18 journals ranked, (3) Source: Table 4 present study; 63 journals ranked, (4) Source: Table 5 present study; 63 journals ranked, (5) Source: Table 6 present study; 63 journals ranked, (6) The overall ranking is based on the simple mean of the ranks from the three aggregate metrics (metrics 2–4 above), (7) Source: Brinn, Jones and Pendlebury (1996); 44 journals ranked, (8) Source: Lowe and Locke (2005); 30 journals ranked, (9) Source: Ballas and Theoharakis (2003); 40 journals ranked; US (EUR) = US (European) rankings [nr = not ranked within the top 40], (10) Source: Oltheten et al. (2005); 40 journals ranked; US (EUR) = US (European) rankings [nr = not ranked within the top 40].

Table 8
Spearman rank correlations between journal rankings in Table 7

	Present study					Perception surveys				
		Metric								
		1	2	3	4					
	Overall rank[1]	indiv pairs[2]	agg pref ratio[3]	agg sub /pub[4]	RAE metric[5]	bjp96[6]	UK ll05[7]	EUR bt03[8]	US bt03[8]	EUR ott05[9]
Present study										
indiv pairs [Metric 1]	0.96** 18									
agg pref ratio [Metric 2]	0.89** 62	0.96** 18								
agg sub/pub **[Metric 3]**	0.89** 63	0.88** 18	0.74** 62							
RAE metric [Metric 4]	0.82** 63	0.77** 18	0.56** 62	0.56** 63						
Perception surveys										
bjp96 (UK)	0.82** 23	0.84** 11	0.82** 23	0.68** 23	0.70** 23					
ll05 (UK)	0.89** 16	0.97** 11	0.78** 16	0.73** 16	0.86** 16	0.79** 15				
bt03 (EUR)	0.47* 18	0.49 11	0.64** 18	0.50* 18	0.22 18	0.52* 16	0.70** 15			
bt03 (US)	0.65* 14	0.90** 9	0.70** 14	0.66** 14	0.46 14	0.84** 14	0.80** 12	0.77** 14		
ott05 (EUR)	0.70** 14	0.49 6	0.37 14	0.68** 14	0.62* 14	1.0** 3	1	1	1	
ott05 (US)	0.65* 12	1.0** 3	0.27 12	0.63* 12	0.44 12	1.0** 4	1.0** 2	1.0** 2	1.0** 2	0.84** 11

Notes: (1) Source: Table 7 present study; 63 journals ranked, (2) Source: Table 3 present study; 18 journals ranked, (3) Source: Table 4 present study; 63 journals ranked, (4) Source: Table 5 present study; 63 journals ranked, (5) Source: Table 6 present study; 63 journals ranked, (6) Source: Brinn, Jones and Pendlebury (1996); 44 journals ranked, (7) Source: Lowe and Locke (2005); 30 journals ranked, (8) Source: Ballas and Theoharakis (2003); 40 journals ranked; US (EUR) = US (European) rankings, (9) Source: Oltheten et al. (2005); 40 journals ranked; US (EUR) = US (European) rankings, (10) No of journals in the comparison is listed under correlation coefficient; ** (*) significant at the 1% (5%) level (2-tailed).

measures are strongly associated with the ranking of accounting journals by Lowe and Locke (2005) (correlations in the range 0.73 to 0.97), and with Brinn et al.'s (1996) rankings (correlations in the range 0.68 to 0.84), probably reflecting the fact that both are ultimately based on the perceptions of the UK accounting and finance community. Correlations between the present rankings and the international surveys are still pretty strong but are, perhaps surprisingly, generally higher with the US than with European perceptions.

Further comparisons with the recent perception survey studies are also enlightening. In particular, there is relatively little overlap between RAE 2001 submissions and the journals included in the surveys. Of the 44 journals included in the Brinn et al. (1996) UK survey, 21 had a relatively small impact on RAE 2001 (thereby excluded from Table 7) with a total of just 31 submissions, representing 2% of the total. Thus, 23 of the Brinn et al. (1996) journals plus an additional 40 journals made up the vast majority of submissions. These 40 journals include eight accounting, 11 finance, eight economic and 13 business and management journals. Thirty accounting journals were ranked in Lowe and Locke (2005), but only 16 featured significantly in RAE 2001.

Of the 58 accounting journals covered in the international survey by Ballas and Theoharakis (2003), 20 contributed to RAE 2001 (per Table 7) but 38 did not. Of 66 finance journals listed in the Oltheten et al. (2005) survey, just 15 contributed to RAE 2001 but 51 did not. Overall, 30 of the journals contributing to RAE 2001 were not included in either of these two surveys. Of these 30, 15 were business and management journals, seven were economic journals, six were accounting and two finance. These observations reflect the considerable diversity of output locations for the UK accounting and finance community, as highlighted by Beattie and Goodacre (2004).

5. Conclusion

Given the many and varied uses to which journal rankings are put, interest in such rankings will persist. Unfortunately, existing methods of constructing such rankings all have significant inherent limitations. This paper proposes a new (complementary) approach that is not restricted to a predefined journal set and, importantly, is based on quality choice decisions driven by economic incentives. Further, the limitations of the present methods are different to those of alternative approaches so the study contributes by providing triangulation for prior studies.

Four metrics are proposed, based on the submission choices made in RAE 2001. Using information from research-active individuals' quality decisions, two rankings were based on pairwise comparisons between journals: first, for a subset of journals using the individual comparisons; second, for all 63 significant RAE 2001 journals using the overall preference ratio for each journal. At the aggregate level, the 'submission to publication ratio' is reported for the same set of journals (with five or more papers submitted to RAE 2001). Fourthly, a weighted average RAE grade (RAE metric) based on the RAE 2001 peer review panel judgments was used. Finally, rankings from the three metrics which could be applied to the full set of 63 journals were combined to produce an overall ranking. Strong correlations were observed between the rankings based on the different metrics and also with the Lowe and Locke (2005) and Brinn et al. (1996) rankings. However, a large number of submissions to RAE 2001 were from journals that are not included in the recent perception survey studies, reflecting the eclecticism within the UK accounting and finance community. Thus, the paper provides a timely analysis of relative journal quality across a wide number of journals of direct relevance to non-US academics.

As with all methods of journal ranking, the present rankings need to be interpreted with care. The metrics used are all proxies for the underlying unobservable construct of interest, which is journal quality. Each of the proxies suffers from (usually different) limitations. For example, the two proxies involving journal comparisons at the individual level may be affected by the strategic allocations of jointly authored papers to specific individuals (as discussed earlier). This does not affect the other two proxies as the measurement takes place either at the UoA level (RAE metric) or across all UoAs. One limitation across all proxies is that they are subject to sampling error since the metrics are based on a relatively small number of observations for some journals. A further issue that cannot be addressed in this study, or by any ranking based on historical data, relates to the dynamic nature of journals and of journal quality. New journals arise, editors and editorial policies change over time so the perceptions of quality on which this paper is based may already have modified. Finally, the metrics can only proxy for the average quality within a particular journal, but the quality of individual papers will vary about the average and will depend on many factors including the quality of the review process. The assessment of the quality of an individual paper remains a matter for expert peer evaluation.[18]

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[18] For the 2008 research assessment exercise, it has already been stated that 'the assessment will be one of peer review based on professional judgment'. The panels concerned do not intend to use ranked lists of journals, mainly on the grounds that there is considerable variability of quality within journals (RAE, 2008).

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Investigating the return predictability of changes in corporate borrowing

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Abstract—This study investigates the return predictability of changes in corporate borrowing by conditioning it on equity styles, state of market, and earnings expectation to determine whether it is due to unidentified sources of risk or mispricing. We observe that increases in borrowing are indeed followed by declines in operating and risk-adjusted return performance. However, the return underperformance exists only in small-cap growth companies experiencing negative earnings surprise, irrespective of the market state. We extend previous studies by demonstrating that the phenomenon is not pervasive over the entire cross-section of the stock market and is likely to be a manifestation of negative price response against the earnings disappointment of small-cap growth companies. Our results have implications for market efficiency and stock selection.

1. Introduction

This paper examines the relationship between changes in corporate borrowing and subsequent stock returns in the UK and investigates if it is conditional on equity style, market state, and earnings expectations. According to the pecking-order theory of corporate financing (Myers, 1984; Myers and Majluf, 1984; Miller and Rock, 1985; Sunder and Myers, 1999), companies prefer internal over external financing to fund their investment and operating expenditures. When external financing is required, the difference in cost leads companies to favour debt over equity. Thus, changes in a company's degree of dependence on debt financing signals the adequacy of its current and consequent financial slack. However, in stock markets that are efficient at least to the semi-strong level, all publicly information should already be fully impounded into the share price (Fama, 1970; 1991). Since information pertaining to changes in borrowing is made available in financial statements, it should bear no significant association with subsequent stock returns. Nevertheless, previous studies from the US confirm the existence of a consistently negative relationship between changes in corporate borrowings and subsequent risk-adjusted abnormal return performance. Spiess and Affleck-Graves (1999) find significant underperformance over a five-year horizon following debt offerings. Dichev and Piotroski (1999) observe negative five-year abnormal returns following debt increase. Billett et al. (2001) show that bank loan announcements are followed by negative returns. Bradshaw et al. (2004) and Dimitrov and Jain (2005) sort the cross-section of stocks by the current changes in debt and demonstrate that it has significantly negative association with future risk-adjusted returns. Like all return predictability phenomena, empirical evidence as such invites three possible explanations, i.e. unidentified risk, mispricing, and data-snooping bias. Our study focuses on distinguishing between the first two explanations but also provides an implication for the third explanation.

If companies that experience an increase in borrowing have higher systematic risk so that shareholders require higher expected returns, then there should be a positive relationship between changes in borrowing and subsequent average stock returns. Lakonishok et al. (1994) suggest that the return performance of high risk companies is negatively related to investors' marginal utility of wealth. During market downturns when investors' marginal utility of wealth is high, they prefer safer stocks and this 'flight towards quality' leads to lower returns of riskier stocks. Thus, if companies that increase their borrowing bear higher systematic risk, then we would expect them to experience lower realised returns during market downturns. Using a UK sample, Agarwal and Taffler (2003) demonstrate that the negative relationship between Z-score and future abnormal returns, previously documented by Dichev (1998) in a US sample, occurs only during market downturns. They interpret this as a manifestation of unidentified sources of systematic risk and argue against the mispricing explanation suggested by Dichev (1998).

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Alternatively, changes in borrowing may correlate systematically with company-specific fundamentals but the market is slow in responding to the associated value relevant information. The existing literature provides ample evidence confirming that the market is slow in reflecting publicly available information contained in financial statements (Bernard and Thomas, 1989; Ou and Penman, 1989; Holtausen and Larcker, 1992; Sloan, 1996; Abarbanell and Bushee, 1998; Piotroski, 2000; Mohanram, 2004). When compared with earnings-based measures, the information provided by changes in borrowing is less prone to manipulation but also less utilised by analysts in company valuation. If changes in borrowing predict risk-adjusted abnormal returns due to mispricing, then we expect the phenomenon to be associated with three features. First, they should be concentrated among companies where investors have greater degree of difficulty in valuation. Second, the direction of the subsequent abnormal returns should be consistent in direction with subsequent changes in operating performance. Third, positive (negative) risk-adjusted abnormal returns should be concentrated among companies that experience positive (negative) earnings surprises.

Predictable cross-sectional variations in the degree of information efficiency within the stock market have been well documented. Arbel and Strebel (1982), Arbel et al., (1983) and Merton (1987) suggest the neglected firm effect where the information quality for smaller companies is relatively low because such firms are not followed by large numbers of professional analysts. Hong et al. (2000) show that information diffusion of small-cap stocks is slower than their large-cap counterparts due to the lack of analyst coverage. Daniel and Titman (1999) suggest that in valuing growth companies, investors are more likely to be affected by judgmental errors due to a higher degree of dependence on subjective and vague information. To support their argument empirically, they demonstrate that the return momentum effect is much stronger among growth stocks. Lev (2001) suggests that information conveyed by financial statement is less (more) useful in the valuation of companies with higher (lower) degree of intangibles. Thus, if the negative relationship between increases in borrowing and subsequent abnormal returns is caused by mispricing, then the above reasons allows us to expect it to be more pronounced among small-cap growth companies.

In terms of correlation with subsequent changes in operating performance, previous studies show that increases in leverage are associated with decline in profitability (Kester, 1986; Titman and Wessels, 1988; Rajan and Zingales, 1995; Sunder and Myers, 1999; Graham, 2000; Graham and Harvey, 2001; Fama and French, 2002). This corroborates in direction with the risk-adjusted abnormal returns following increases in borrowing (Spiess and Affleck-Graves, 1999; Dichev and Piotroski, 1999; Bradshaw et al., 2004; Dimitrov and Jain, 2005). Dimitrov and Jain (2005) demonstrate that current changes in borrowing are negatively related to current operating performance and both current and future risk-adjusted returns. From these findings they argue that changes in borrowing are value relevant but the information they contain is not fully reflected into the share prices due to the investors' focus on earnings-based measures of corporate valuation.

To further substantiate the mispricing explanation, we would expect the negative (positive) abnormal returns to be clustered among companies were the forecasted earnings performance is higher (lower) than the subsequently realised actual earnings performance. The resulting negative (positive) earnings surprise causes the market to push the stock price downward (upward), leading to negative (positive) abnormal returns. Bradshaw et al., (2004) show that external financing, including both debt and equity, is positively related to over-optimism in analysts' earnings forecasts. They suggest this implies that the long-run return underperformance, which follows corporate financing activities such as IPO, SEO, and borrowing, may be a result of mispricing. Skinner and Sloan (2002) shows that the inferior returns to growth stocks relative to value stocks mainly occur among companies that experience negative earnings surprises, although growth stocks are at least as likely to announce both positive and negative earning surprises. They suggest this finding provides compelling evidence that stocks returns are influenced by expectational errors about future earnings performance.

We extend previous studies on the association between changes in borrowing and subsequent risk-adjusted abnormal returns by directly testing whether it is conditional on equity styles, market states, and earnings expectation. These analyses test the predictions above and coherence of their inference helps reveal whether the return predictability of changes in borrowing is more likely to be a manifestation of mispricing or unidentified sources of systematic risk. We first partition the cross-section of sampled stocks into common equity styles such as small-cap value, large-cap value, small-cap growth, and large-cap growth based on their market value and book-to-market value. As suggested earlier, the mispricing explanation would lead us to expect a stronger effect among small-cap growth stocks since they are less followed by investors and more difficult to value. We then split the time-series observations into up and down market states. Riskier companies are less attractive to risk averse investors during down markets when the marginal utility of wealth is high. The investors' 'flight toward quality' would lead to the price decline of riskier stocks. If the negative risk-adjusted abnormal returns that follow increases in borrowing are the result of an unidentified source of systematic risk, then it should exist mainly during market downturns. Finally, we partition the cross-section of sampled stocks by analyst forecast errors. If companies that increase their borrowing subsequently experience negative abnormal returns because they are mispriced as Bradshaw et al., (2004) and Dimitrov and Jain (2005) suggest, then this return underperformance should concentrate only among companies where the analyst consensus forecast earnings are above the actual reported earnings.

Apart from these explicit differences in research design, we also differ from previous studies in the following ways. By applying a UK sample, we provide independent out-of-sample evidence to serve as a safeguard against data-snooping bias of existing studies that focus on US samples. Instead of examining post-announcement long-run return performance like Spiess and Affleck-Graves (1999) and Billett et al., (2001) or focusing only on companies that increase debt like Dichev and Piotroski (1999), our study samples the entire cross-section of the stock market like Bradshaw et al., (2004) and Dimitrov and Jain (2005). In addition to these two studies, we directly condition the return predictability of changes in borrowing on the direction of earnings surprises to obtain a more powerful inference on whether the phenomenon is due to mispricing as concluded by these studies.

Our findings are as follows. First, consistent with existing US evidence, we observe a negative relationship between changes in borrowing and subsequent operating performance as well as risk-adjusted abnormal returns in general. We measure operating performance by industry median adjusted changes in ROA. This observation exists across all four equity style classifications, indicating that changes in corporate borrowing are generally a good predictor of profitability irrespective of company attribute. To measure abnormal returns, we apply the Fama and French (1996) three-factor model as the risk benchmark. From both excess and risk-adjusted abnormal returns, we observe that the return predictability pertaining to changes in borrowings exists only among small-cap growth companies. This suggests that the investigated phenomenon is not a pervasive effect across the whole cross-section of the stock market. Instead, it only concentrates among companies where we expect that mispricings are more likely to occur based on the arguments explained earlier. Our test also reveals that the examined effect is mainly due to the significant underperformance in risk-adjusted abnormal returns among small-cap growth companies with high increases in borrowings. In contrast, there are no statistically significant positive abnormal returns for companies with lower changes in borrowings. Although there is evidence here that accounting-based information from publicly available financial statements can predict subsequent abnormal returns, which is inconsistent with the semi-strong form of market efficiency, it is only confined within small-cap growth stocks and prospective investors that attempt to exploit it could be impeded by the associated transaction costs and short selling restrictions. On the other hand, it may benefit existing shareholders of small-cap growth companies in their decisions to re-balance their portfolios.

Further investigation reveals that small-cap growth companies with high increases in borrowings subsequently experience abnormal return underperformance in both up and down markets but this phenomenon occurs only among companies experiencing negative earnings surprises. The observation that the negative returns do not arise only during market downturn implies that it is not the investors' "flight towards quality", when their marginal utility of wealth is high, that depresses the stock price of small-cap growth companies with high increases in borrowings. This mitigates the possibility that it is a manifestation of unidentified sources of systematic risk. An alternative way to explain the negative abnormal returns associated with increases in borrowing is to apply the Fama and French (1992; 1996) risk compensation argument. But to do so, we will be assuming that companies that increase (decrease) borrowing have lower (higher) subsequent returns because they bear relatively less (more) risk, which is difficult to substantiate. Our observation that the abnormal return underperformance occurs only among small-cap growth companies with earnings disappointments also allays the risk compensation argument, since it implies that investors are only rewarded for bearing risk among companies with negative earnings surprises among this particular equity style.

In fact, the concentration among negative earnings surprise companies suggests that the negative abnormal returns are likely to be a result of mispricing, i.e. prices are pushed downwards following the revelation of poorer earnings. It provides more direct evidence in support of the mispricing explanation than Bradshaw et al., (2004) and Dimitrov and Jain (2005). We show that such negative price response occurs only among small-cap growth companies even though companies that increase in borrowings are also associated with significantly poorer subsequent operating performance in every other equity style classification. The asymmetrically negative reaction of investors to the earnings disappointment among small-cap growth companies supports the prediction mentioned earlier that investors' judgmental errors are more likely to occur among such companies that are less followed by investors and more difficult to value. This finding is broadly consistent with the earnings torpedo effect documented by Skinner and Sloan (2002). They show that investors' price responses to earnings disappointments among growth stocks are asymmetrically negative relative to value stocks and this causes the inferior returns among growth stocks. They argue that investors tend to attach overly optimistic expectations to growth stocks, leading to excessively negative reaction when upon negative earnings surprises. An important implication they suggest is that managers of growth companies may have higher incentive to manage reported earnings to avoid such negative price response. Based on our study, the same implication applies to small-cap growth companies with high increase in borrowing. Our evidence that negative price response follows earnings disappointment suggests that they have a greater necessity to conduct earnings management.

Drawing all the evidence, we show that although changes in borrowing are negatively associated with subsequent abnormal returns, the phenomenon is not pervasive across the entire cross-section of the stock market and is more likely to be a manifestation of a mispricing effect instead of unidentified sources of systematic risk. This paper proceeds as follows. Section 2 describes the sample and methodology. Section 3 presents and discusses the empirical findings. Section 4 concludes.

2. Sample and methodology

Our full sample consists of over 4,700 companies listed on the London Stock Exchange over the period 1977 to 2004. All data required to construct portfolios are obtained from Datastream and components to calculate analyst forecasts errors are obtained from I/B/E/S. Since the merger of Datastream and Worldscope, most accounting-based variables are available only from the late 1980s onward. Therefore, our full test period covers 07/1989 to 06/2004. We impose no fiscal year end restrictions but exclude financial companies and those with negative book-to-market values.

We construct portfolios from the cross-section of sampled stocks at the end of June each year and hold them for the subsequent 12 months. The one year change in borrowing (ΔTD) is calculated as the change in total debt of the previous fiscal year from the year before scaled by total assets at the beginning of the previous fiscal year. We adopt this measure to extract changes in borrowing instead of the change in debt-to-equity or debt-to-asset ratio to avoid the effect of changes in the equity or asset base over the same period of time. Each year, stocks with ΔTD value below the 30th percentile (above the 70th percentile) are assigned to tercile 1 (3) and the rest to tercile 2. We also partition stocks each year into equity styles by their book-to-market value and size. To calculate book-to-market value (BM), we divide book value of the previous fiscal year by market value at the end of December of the previous year. We classify stocks as growth (value) if their BM value is below (above) the median. In terms of size, we categorise stocks into big (small) if their market value (MV) in June of the current year is above (below) the 70th percentile. This addresses the dominance of lower market value companies in the UK. The intersection of independent sorts of BM and MV partitions the cross-section of stocks into four common equity styles, i.e. small-cap value (VS), large-cap value (VB), small-cap growth (GS), and large-cap growth (GB). Further intersections with independent sorts on ΔTD result into 12 (2 x 2 x 3) intersection portfolios and four zero-investment hedge portfolios that exploit information between stocks with extreme values in ΔTD among small-cap value (VS3–1), large-cap value (VB3–1), small-cap growth (GS3–1), and large-cap growth (GB3–1) styles. Since these portfolios are rebalanced annually at the end of June each year over the entire test period, we ensure at least a six-month publication gap for financial statements to reach the investors.

We evaluate the subsequent operating performance and risk-adjusted returns of these portfolios. For operating performance, we measure the average industry median adjusted one year change in return on asset (ΔROA) between the previous fiscal year end and the year before (ex-ante) and between the current fiscal year end and the previous fiscal year end (ex-post). The former is contemporaneous to the period we measure ΔTD and the latter is one period after. We apply the FTSE actuaries industrial classification. For risk-adjusted returns, we calculate the value weighted monthly returns from July of each year to June of the subsequent year and apply the Fama and French (1996) three-factor model regression:

$$R_{it} - Rf_t = \alpha_i + \beta_i MKT_t + s_i SMB_t + h_i HML_t + \varepsilon_{it} \quad (1)$$

where R_{it} is the returns on portfolio i in month t; Rf_t is the risk free return in month t; MKT_t is the market premium factor in month t; SMB_t is the size premium factor in month t; and HML_t is the value premium factor in month t. The risk free return is proxied by the one-month UK T-bill yield. MKT_t is the difference between the market index return and the risk free return. The market index is constructed from the value-weighted portfolio constructed from all stocks available in the cross-section. SMB_t is the value weighted return difference between low and high market value stocks partitioned by the 70th percentile and neutral in book-to-market value effect. HML_t is the value-weighted return difference between high (above 60th percentile) and low (below 40th percentile) book-to-market value stocks and neutral in size effect.[1] If the ex-post return performance associated with the changes in borrowing is fully explained by risk captured by the asset pricing model, the intercept will be statistically insignificant. Whether or not the value and size premiums are attributed to covariance or characteristics remains an open debate (Daniel and Titman, 1997; Davis et al., 2000) in the current literature. However, the zero-investment hedge portfolios we construct with a long (short) position in high (low) ΔTD stocks are already balanced on both sides in terms of book-to-market value and size characteristics. Thus, our portfolio-based time-series regression controls for the effect of both covariance and characteristics.

We apply two additional tests to the return predictability of changes in borrowing. First, we bifurcate the time-series of monthly portfolio returns into up and down markets and run the regressions separately. Following Lakonishok and Shapiro (1986), we define up (down) market months as months when the MKT_t factor return is positive (negative). Second, we partition the stocks within each portfolio based on the earnings surprises and repeat the regression analysis. Following Doukas et al. (2002), we calculate analyst forecast error as the difference between the consensus one-fiscal-year-ahead annual earnings forecast and actual earnings of the current fiscal year scaled by price measured at the end of the previous fiscal year. We select the analyst consensus forecast available six months before the current fiscal year end to ensure that analysts have access to the previous year's annual report at the time of their forecast.[2] A positive (negative) value of the forecast error indicates a negative (positive) earnings surprise.

3. Empirical findings

Table 1 presents descriptive statistics for the 12 intersection portfolios constructed from independent sorts of BM, MV, and ΔTD.[3] Notice that BM and MV values are fairly similar across the ΔTD terciles within each of the four style combinations, i.e. VS, VB, GS, and GB. Due to the 70th percentile breakpoint for MV, large-cap portfolios tend to have a lower number of stocks. Among both the small-cap and large-cap groups, the growth style stocks tend to have higher market value than their value style counterparts, which confirms the negative correlation between BM and MV values. On average, the growth style stocks tend to have higher magnitude of ΔTD than their value style counterparts. Notice that the low ΔTD portfolios across all style combinations have negative changes in borrowing, which indicates that their constituent companies are net debt repayers on average.

Table 2 shows the operating performance of the 12 intersection portfolios and the four style-based zero-investment hedge portfolios through industry median adjusted one year ΔROA. The ex-ante industry adjusted ΔROA is measured over the period contemporaneous to the ΔTD values. Across all four equity style classifications, we see significantly negative spread in this value between extreme ΔTD portfolios. The last column (AVG3–1) shows the average of the results across all equity style classifications. It indicates that this relationship is significant (–0.019, t-statistic = –4.995) throughout the cross-section of the sampled companies after controlling for their BM and MV characteristics in the equity style classifications. This result suggests that changes in borrowing are indeed highly correlated with current operating performance. The ex-post industry adjusted ΔROA is measured over the one year period after the ΔTD values. Notice that across all style classifications there are significantly negative associations between changes in borrowings and subsequent operating performance. The last column (AVG3–1) also shows that this relationship is significant (–0.017, t-statistic = –8.567), indicating that the ΔTD predicts industry adjusted ΔROA after controlling for BM and MV characteristics of the sampled stocks. Table 2 suggests that changes in borrowing generally serve as an instrument for both current and subsequent operating performance of companies relative to their competitors in the same industry.

Table 3 presents the value-weighted monthly excess returns of the portfolios. The last column (AVG3–1) averages the zero-investment hedge portfolio with long position in high ΔTD and short position in low ΔTD stocks across all equity style classifications and it indicates a statistically significant negative return spread (–0.004, t-statistic = –3.018). However, among the hedge portfolios of individual equity styles, only the small-cap growth (GS) group shows statistically significant negative returns (–0.007, t-statistic = –3.488). This indicates that despite its ability to predict operating performance in all other equity styles, change in borrowing only predicts stock return among small-cap growth companies. This indicates that the neg-

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[1] In constructing the SMB and HMB factors, we follow the breakpoints of Dimson et al. (2003) to address the skewness in size distribution, which Fama and French allow for by forming breakpoints using only the NYSE stocks, and the negative correlation between value and size in the UK.

[2] Doukas et al. (2002) apply an eight-month horizon before the current fiscal year end and suggest that according to Penman (1987), the majority of companies file their annual report with the SEC within three months of their fiscal year end. Since similar information is not available for UK companies, we apply a conservative six-month gap.

[3] We winsorised the top and bottom 1% of the ΔTD values to avoid the influence of outliers.

Table 1
Descriptive statistics

This table presents the average number of companies (co#), book-to-market value (BM), market value (MV), and changes in borrowing (ΔTD) pertaining to the 12 intersection portfolios (2 x 2 x 3) independently sorted on BM, MV, and ΔTD over the sample period of 07/1989 to 06/2004. BM is the book value of previous fiscal year divided by market value at the end of December of the previous calendar year. MV is measured at the end of June each year. ΔTD is the change in total debt of the previous fiscal year from the year before scaled by total assets at the beginning of the previous fiscal year end. Companies with BM above (below) the median are classified as value (growth). Companies with MV below (above) the 70th percentile are classified as small (big). Companies are partitioned into terciles (1, 2, and 3) by ΔTD using the 30th and 70th percentile as breakpoints. VS, VB, GS, and GB designate small-cap value, large-cap value, small-cap growth, and large-cap growth equity styles respectively.

	VS1	*VS2*	*VS3*	*VB1*	*VB2*	*VB3*	*GS1*	*GS2*	*GS3*	*GB1*	*GB2*	*GB3*
co#	117	143	98	24	37	26	80	103	83	48	72	61
BM	1.369	1.443	1.342	0.961	1.018	0.944	0.323	0.327	0.316	0.319	0.306	0.299
MV	33.198	37.656	36.478	1409.546	1999.217	1522.287	55.343	61.606	61.713	2630.456	2622.315	2440.064
ΔTD	–0.073	0.012	0.380	–0.063	0.016	0.165	–0.090	0.012	0.388	–0.066	0.014	0.206

Table 2
Operating performance

This table presents the operating performance pertaining to the intersection portfolios independently sorted on book-to-market value (BM), market value (MV), and changes in borrowing (ΔTD) over the sample period of 07/1989 to 06/2004. It shows the average industry median adjusted one year change in ROA (ΔROA) between previous fiscal year end and the fiscal year end before (ex-ante) and between current fiscal year end and the previous fiscal year end (ex-post). We use FTSE Actuaries industry classification. BM is the book value of previous fiscal year divided by market value at the end of December of the previous calendar year. MV is measured at the end of June each year. ΔTD is the change in total debt of the previous fiscal year from the year before scaled by total assets at the beginning of the previous fiscal year end. Companies with BM above (below) the median are classified as value (growth). Companies with MV below (above) the 70th percentile are classified as small (big). Companies are partitioned into terciles (1, 2, and 3) by ΔTD using the 30th and 70th percentile as breakpoints. VS, VB, GS, and GB designate small-cap value, large-cap value, small-cap growth, and large-cap growth equity styles respectively. VS3-1, VB3-1, GS3-1, and GB3-1 are the differences in operating performance between the highest and lowest ΔTD terciles and AVG3-1 is their average.

	VS1	*VS2*	*VS3*	*VB1*	*VB2*	*VB3*	*GS1*	*GS2*	*GS3*	*GB1*	*GB2*	*GB3*	*VS 3-1*	*VB 3-1*	*GS 3-1*	*GB 3-1*	*AVG 3-1*
Ex-ante	0.006	–0.002	–0.024	0.005	–0.005	–0.011	0.012	0.006	–0.005	0.006	0.003	–0.005	–0.030	–0.016	–0.017	–0.011	–0.019
	(1.960)	(–0.830)	(–5.701)	(1.137)	(–1.268)	(–3.123)	(1.679)	(0.719)	(–1.199)	(1.260)	(1.171)	(–1.500)	(–7.734)	(–2.592)	(–2.151)	(–1.872)	(–4.995)
Ex-post	0.002	–0.008	–0.018	0.000	–0.006	–0.009	0.015	–0.001	–0.011	0.005	0.006	–0.007	–0.020	–0.009	–0.026	–0.012	–0.017
	(0.893)	(–3.512)	(–5.612)	(–0.121)	(–2.048)	(–2.119)	(2.942)	(–0.225)	(–2.383)	(1.687)	(3.198)	(–2.556)	(–5.736)	(–2.097)	(–4.101)	(–3.731)	(–8.567)

Table 3
Excess return performance

This table presents the average monthly excess returns pertaining to the intersection portfolios independently sorted on book-to-market value (BM), market value (MV), and changes in borrowing (ΔTD) over the sample period of 07/1989 to 06/2004. The excess return is calculated as the value-weighted portfolio return less risk free return proxied by one-month UK T-bill yield. BM is the book value of previous fiscal year divided by market value at the end of December of the previous calendar year. MV is measured at the end of June each year. ΔTD is the change in total debt of the previous fiscal year from the year before scaled by total assets at the beginning of the previous fiscal year end. Companies with BM above (below) the median are classified as value (growth). Companies with MV below (above) the 70th percentile are classified as small (big). Companies are partitioned into terciles (1, 2, and 3) by ΔTD using the 30th and 70th percentile as breakpoints. VS, VB, GS, and GB designate small-cap value, large-cap value, small-cap growth, and large-cap growth equity styles respectively. VS3-1, VB3-1, GS3-1, and GB3-1 are zero-investment hedge portfolios with long (short) position in the highest (lowest) ΔTD terciles and AVG3-1 is their average.

	VS1	*VS2*	*VS3*	*VB1*	*VB2*	*VB3*	*GS1*	*GS2*	*GS3*	*GB1*	*GB2*	*GB3*	*VS 3-1*	*VB 3-1*	*GS 3-1*	*GB 3-1*	*AVG 3-1*
All months	0.018	0.017	0.017	0.009	0.012	0.005	0.019	0.017	0.011	0.008	0.007	0.005	–0.001	–0.004	–0.007	–0.003a	–0.004
	(4.515)	(4.528)	(3.960)	(1.935)	(3.026)	(1.225)	(3.922)	(3.423)	(2.478)	(2.254)	(2.089)	(1.227)	(–0.466)	(–1.060)	(–3.488)	(–1.167)	(–3.018)
Excluding January	0.016	0.014	0.015	0.009	0.013	0.007	0.017	0.015	0.009	0.008	0.008	0.005	–0.001	–0.003	–0.008	–0.003	–0.004
	(3.949)	(3.742)	(3.320)	(1.941)	(3.233)	(1.724)	(3.440)	(2.805)	(1.874)	(2.269)	(2.454)	(1.282)	(–0.622)	(–0.647)	(–3.797)	(–1.165)	(–2.885)
Excluding April	0.016	0.015	0.014	0.007	0.009	0.005	0.018	0.016	0.010	0.006	0.005	0.004	–0.002	–0.002	–0.008	–0.003	–0.004
	(3.866)	(3.811)	(3.294)	(1.441)	(2.299)	(1.201)	(3.547)	(3.132)	(2.032)	(1.749)	(1.605)	(0.912)	(–0.689)	(–0.493)	(–3.606)	(–0.995)	(–2.689)

ative association between changes in borrowing and subsequent stock returns is not pervasive across the entire cross-section of the stock market. It also shows that the return predictability exists only in the group of companies that are more likely to be mispriced. As mentioned earlier, small-cap growth companies tend to be less followed by analysts, have slower information dissemination, and are more difficult to value due to higher degree of intangibles associated with growth opportunities. Table 3 implies that over the test period of 07/1989 to 06/2004, small-cap growth fund managers could short high ΔTD and long low ΔTD stocks and earn 8.4% value-weighted annual returns above the risk free return. In results that are not tabulated, this trading strategy yields positive annual excess returns in 11 out of the 15 sampled years, which indicates a high degree of persistence. Of course, the actual profitability of such strategy may be affected by the higher transaction costs and short selling restrictions of small-cap stocks. However, notice in Table 1 that among the small-cap portfolios, i.e. small-cap value (VS) and small-cap growth (GS), the latter group has higher average market capitalisation. As suggested earlier, this is due to the negative correlation between book-to-market value and market value in the UK stock market. What this also suggests is that the return predictability of changes in borrowing exists among the companies with higher market capitalisation among those classified as small-cap given the 70th percentile breakpoint we applied. These are the small-cap companies associated with growth opportunities. Finally, Table 3 also shows that this effect is robust after controlling for the widely documented January seasonality and UK-specific April tax effect.

Table 4 shows value-weighted monthly abnormal return performance of the portfolios risk-adjusted by the Fama and French (1996) model. The last column (AVG3–1) indicates that after controlling for both covariance risk and characteristics such as BM and MV, the negative return spread between extreme ΔTD stocks persists (–0.003, t-statistic = –2.614). As in Table 3, only among the small-cap (GS) group does the zero-investment hedge portfolio that longs high ΔTD and shorts low ΔTD stocks yield statistically significantly negative abnormal returns (–0.008, t-statistic = –4.235). Notice that the intercept of portfolio GS3 is significantly negative (–0.007, t-statistic = –5.148), while the intercept of GS1 is insignificant. This indicates that the stock return for high ΔTD stocks in the small-cap growth group is too low compared not only to stocks of the similar BM and MV characteristics but also given their loadings on the Fama–French risk factors. Thus, to prospective small-cap growth investors, this would mainly be a short-selling driven strategy. However, from the perspective of the existing shareholders of small-cap growth companies, our findings have implications to their portfolio re-balance decisions. Over the sample period of 07/1989 to 06/2004, about 8.4% annual loss in terms of risk-adjusted abnormal returns can be avoided by using the information associated with changes in borrowing. Table 4 basically confirms the pattern in Table 3, i.e. the return predictability of ΔTD is confined within the small-cap growth group but also goes further to indicate that it persists after risk adjustment by the Fama and French (1996) three-factor model. The basic intuition one associate with companies with high increase in borrowing is that they are in financial distress and would bear higher default risk. The broad justification Fama and French (1996) had for their model, which we apply as risk benchmark, is that the additional size and value premium based factors, i.e. SMB and HML, capture distress risk omitted by the market premium factor of CAPM. Studies such as Vassalou and Xing (2004) also suggest that SMB and HML may be capturing default related risk. Our findings suggest that the return spread between extreme ΔTD stocks among the small-cap growth groups cannot be explained by these factors. In the last column (AVG3–1), notice that the factor loadings on both SMB and HML are insignificant. This either suggests that on the average companies with high increases in borrowings are not associated with higher distress risk or that the factors are not good proxies of such risk. Of course, it is always possible to argue that this phenomenon may be a manifestation of unidentified sources of systematic risks beyond the Fama and French (1996) three-factor model that we applied. We evaluate this possibility in Table 5.

Table 5 presents the value-weighted abnormal return performance of the ΔTD premium among the small-cap growth style conditional on the state of markets. The purpose of this test is to observe if the abnormal return underperformance of high ΔTD companies is concentrated only during down market (market index return < risk free return) periods, when the marginal utility of investors is high. If this is the case, it is possible to argue that the return performance of high ΔTD stocks is negatively correlated with marginal utility, which would support the argument that it is related to systematic risk. Panel A shows the result of up market states (market index return > risk free return). Notice that the GS3 portfolio has significantly negative regression intercept (–0.010, t-statistic = –2.933). The zero-investment hedge portfolio GS3-1 also yields significantly negative intercept (–0.007, t-statistic = –2.448). The findings in Panel A indicate that the abnormal return underperformance of small-cap growth companies with high ΔTD remains pronounced during up market periods. Panel B shows that GS3 portfolio

Table 4
Abnormal return performance

This table presents the Fama and French (1996) three-factor model time-series regression results pertaining to the intersection portfolios independently sorted on book-to-market value (BM), market value (MV), and changes in borrowing (ΔTD) over the sample period of 07/1989 to 06/2004. The value-weighted excess returns of these portfolios are regressed on market premium (MKT), size premium (SMB), and value premium (HML) based factors. The excess return is calculated as the value-weighted portfolio return less risk free return proxied by one-month UK T-bill yield. BM is the book value of previous fiscal year divided by market value at the end of December of the previous calendar year. MV is measured at the end of June each year. ΔTD is the change in total debt of the previous fiscal year from the year before scaled by total assets at the beginning of the previous fiscal year end. Companies with BM above (below) the median are classified as value (growth). Companies with MV below (above) the 70th percentile are classified as small (big). Companies are partitioned into terciles (1, 2, and 3) by ΔTD using the 30th and 70th percentile as breakpoints. MKT is the value-weighted market index return less risk free return. The market index is constructed from the cross-section of all sampled stocks. The SMB is the value-weighted return spread between small (< 70th percentile) and big (> 70th percentile) market-cap stocks. The HML is the value-weighted return spread between high (> 60th percentile) and low (< 40th percentile) book-to-market stocks. VS, VB, GS, and GB designate small-cap value, large-cap value, small-cap growth, and large-cap growth equity styles respectively. VS3-1, VB3-1, GS3-1, and GB3-1 are the zero-investment hedge portfolios with long (short) position in the highest (lowest) ΔTD terciles and AVG3-1 is their average. All t-statistics are based on White (1980) heteroskedasticity consistent standard errors.

	VS1	*VS2*	*VS3*	*VB1*	*VB2*	*VB3*	*GS1*	*GS2*	*GS3*	*GB1*	*GB2*	*GB3*	*VS 3-1*	*VB 3-1*	*GS 3-1*	*GB 3-1*	*AVG 3-1*
Intercept	0.000	0.000	–0.001	–0.005	0.002	–0.004	0.002	–0.001	–0.007	0.001	–0.001	–0.002	–0.002	0.001	–0.008	–0.004	–0.003
	(0.187)	(0.197)	(–0.716)	(–1.786)	(1.038)	(–1.662)	(0.927)	(–0.266)	(–5.148)	(0.748)	(–0.519)	(–1.382)	(–0.775)	(0.165)	(–4.235)	(–1.516)	(–2.614)
MKT	0.969	0.891	0.987	1.173	0.993	0.923	1.031	1.008	1.118	0.896	0.931	0.975	0.018	–0.251	0.087	0.079	–0.017
	(22.178)	(22.032)	(17.596)	(15.509)	(19.074)	(13.367)	(22.969)	(19.600)	(30.639)	(20.499)	(26.443)	(26.400)	(0.290)	(–2.213)	(1.699)	(1.432)	(–0.460)
SMB	0.833	0.837	0.913	0.208	–0.065	–0.055	0.944	1.000	0.914	–0.142	–0.040	–0.073	0.080	–0.262	–0.030	0.070	–0.036
	(16.480)	(21.447)	(17.807)	(2.562)	(–1.301)	(–0.906)	(11.733)	(23.156)	(22.352)	(–2.934)	(–1.015)	(–1.798)	(1.238)	(–2.537)	(–0.428)	(1.064)	(–0.915)
HML	0.773	0.643	0.710	0.603	0.777	0.536	–0.143	–0.219	0.087	–0.098	–0.028	–0.411	–0.063	–0.067	0.231	–0.313	–0.053
	(9.612)	(9.834)	(9.384)	(4.882)	(10.513)	(5.611)	(–1.878)	(–1.260)	(1.522)	(–1.088)	(–0.363)	(–4.275)	(–0.839)	(–0.454)	(2.609)	(–2.131)	(–1.094)
AdjR^2	0.858	0.868	0.809	0.673	0.775	0.634	0.846	0.855	0.904	0.733	0.817	0.795	0.008	0.064	0.060	0.096	–0.007

Table 5
Abnormal return performance: up market vs. down market

This table presents the average monthly excess returns and Fama and French (1996) three-factor model time-series regression results pertaining to the small-cap growth (GS) style tercile portfolios partitioned by change in borrowing (ΔTD) (see Table 1 for construction algorithm) over the sample period of 07/1989 to 06/2004 and bifurcated into up and down markets. The value-weighted excess returns of these portfolios are regressed on market premium (MKT), size premium (SMB), and value premium (HML) based factors. The excess return is calculated as the value-weighted portfolio return less risk free return proxied by 1-month UK T-bill yield. MKT is the value-weighted market index return less risk free return. The market index is constructed from the cross-section of all sampled stocks. The SMB is the value-weighted return spread between small (< 70th percentile) and big (> 70th percentile) market-cap stocks. The HML is the value-weighted return spread between high (> 60th percentile) and low (< 40th percentile) book-to-market stocks. GS3-1 is the zero-investment hedge portfolio with long (short) position in the highest (lowest) ΔTD tercile. Panel A (B) shows the results of up (down) markets, which are the months when the market index return is above (below) the risk-free return. All t-statistics are based on White (1980) heteroskedasticity consistent standard errors.

Panel A: Up market					*Panel B: Down market*				
	GS1	*GS2*	*GS3*	*GS3-1*		*GS1*	*GS2*	*GS3*	*GS3-1*
Excess return	0.048	0.044	0.041	–0.007	Excess return	–0.028	–0.025	–0.035	–0.008
	(8.975)	(7.532)	(8.594)	(–2.448)		(–5.115)	(–4.149)	(–6.263)	(–2.696)
Intercept	0.005	–0.007	–0.010	–0.014	Intercept	–0.002	0.002	–0.006	–0.004
	(0.933)	(–1.720)	(–2.933)	(–3.041)		(–0.628)	(0.429)	(–2.245)	(–1.062)
MKT	0.954	1.137	1.177	0.223	MKT	0.970	1.029	1.095	0.125
	(8.987)	(8.361)	(12.593)	(1.985)		(11.334)	(10.960)	(20.014)	(1.353)
SMB	1.045	1.059	0.992	–0.053	SMB	0.746	0.909	0.816	0.070
	(14.975)	(16.333)	(19.028)	(–0.649)		(6.631)	(13.697)	(15.700)	(0.854)
HML	–0.211	–0.308	0.162	0.373	HML	0.017	–0.031	0.012	–0.006
	(–2.277)	(–1.267)	(1.979)	(3.657)		(0.158)	(–0.382)	(0.169)	(–0.068)
AdjR^2	0.796	0.803	0.829	0.156	AdjR^2	0.774	0.842	0.891	–0.007

has significantly negative regression intercept (–0.006, t-statistic = –2.245). However, the GS3-1 zero-investment hedge portfolio's negative return is now statistically insignificant. The overall finding of Table 5 is that the abnormal return underperformance of high ΔTD companies among the small-cap growth style exists in both down and up market states. In fact, it is even stronger in the up market state, since the spread between extreme ΔTD stocks is also significant. It is not possible to draw inference that the underperformance of the heavy borrowers is due to investors' flight to quality during market downturns. This mitigates the possibility that the phenomenon is due to unidentified sources of systematic risk that the applied Fama and French (1996) three-factor model did not capture.

Table 6 presents the value-weighted abnormal return performance of the small-cap growth group conditional on the earnings surprise of the companies. Panel A shows the results of companies with negative earnings surprises (analyst forecasted EPS > actual reported EPS).[4] The zero-investment hedge portfolio (GS3–1) that longs high ΔTD and shorts low ΔTD stocks yields significantly negative monthly excess returns (–0.011, t-statistic = –3.908) and risk-adjusted abnormal returns (–0.011, t-statistic = –4.498). The GS3 portfolio, which consists of small-cap growth companies with high ΔTD value, yields significantly negative abnormal returns (–0.010, t-statistic = –6.001). In contrast, Panel B shows that among the positive earnings surprise groups (analyst forecasted EPS < actual reported earnings), the high ΔTD stocks do not significantly underperform their low ΔTD counterparts in terms of both monthly excess returns and risk-adjusted abnormal returns. In Panel B, the GS3 portfolio shows negative but insignificant intercept value and the GS3-1 zero-investment hedge portfolio also indicates no significantly negative return spread between the extreme ΔTD stocks. Table 6 indicates that the negative returns associated with small-cap growth companies that increase in borrowing exist only among those that experience negative earnings surprises.[5]

Recall that in Table 2, high ΔTD companies are associated with significant decline in subsequent operating performance not only in small-cap growth stocks, but across all other style classifications as well. However, in Tables 3 and 4, we find that high ΔTD companies are only associated with return underperformance among the small-cap growth groups. In Table 5, we show that this phenomenon is not sensitive to market movements. These observations, together with those of Table 6, suggest that the abnormal return underperformance of high ΔTD companies is due to the mispricing among small-cap growth companies. In general, our findings from the UK support the mispricing explanation of parallel US studies such as Bradshaw et al., (2004) and Dimitrov and Jain (2005). Furthermore, we extend their findings by showing that the underlying phenomenon is not prevalent over the entire cross-section of the stock market and that it is the manifestation of the negative price response against small-cap growth companies following the revelation of their earnings disappointment. This draws similar inference to the earnings torpedo effect documented by Skinner and Sloan (2002). They show that among negative earnings surprise companies, growth companies experience asymmetrically negative price response relative to value companies. They argue that investors respond in such a way because they tend to attach overly optimistic expectations to the performance of growth companies, which implies that growth companies might have greater incentive to manage reported earnings. Our findings share similar implications for small-cap growth stocks because increases in borrowing predict operating performance in all of the four common equity style classifications but only among small-cap growth are they associated with negative abnormal returns. On the other hand, existing shareholders of small-cap growth companies may want to pay more attention to the information contained in changes in borrowing knowing that they predict a decline in operating performance that may invite negative price response from fellow investors.

4. Conclusion

We extend existing literature on the return predictability of changes in borrowing by conditioning it on equity style classifications, the market states, and earnings surprise to determine whether it is due to unidentified sources of risk or mispricing. Our investigation reveals that companies with high increase in borrowing are associated with decline in operating performance across all the common equity style classifications including small-cap growth, but are associated with abnormal return underperformance only if they belong in the small-cap growth group that experiences negative earnings surprises. The observation is robust after controlling for both covariance risks through the application of the Fama and French (1996) three-factor model and characteristics based on book-to-market value and market value. This effect also persists in both up and down markets, which sug-

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[4] Over the entire test period, 47.02% of the small-cap growth companies are classified as having experienced negative earnings surprises.

[5] The hedge portfolios in Table 4 are implementable (subject to short-selling restrictions) since all required information is available ex-ante. In contrast, the hedge portfolios in Table 6 are not implementable unless investors have perfect foresight on the direction of analyst forecast errors.

Table 6
Abnormal return performance: negative vs. positive earnings surprises

This table presents the average monthly excess returns and Fama and French (1996) three-factor model time-series regression results pertaining to the small-cap growth (GS) style tercile portfolios partitioned by change in borrowing (ΔTD) (see Table 1 for construction algorithm) over the sample period of 07/1989 to 06/2004 for companies that experienced negative and positive earnings surprises. The value-weighted excess returns of these portfolios are regressed on market premium (MKT), size premium (SMB), and value premium (HML) based factors. The excess return is calculated as the value-weighted portfolio return less risk free return proxied by one-month UK T-bill yield. MKT is the value-weighted market index return less risk free return. The market index is constructed from the cross-section of all sampled stocks. The SMB is the value-weighted return spread between small (< 70th percentile) and big (> 70th percentile) market-cap stocks. The HML is the value-weighted return spread between high (> 60th percentile) and low (< 40th percentile) book-to-market stocks. GS3-1 is the zero-investment hedge portfolio with long (short) position in the highest (lowest) ΔTD tercile. Panel A (B) shows the results of companies with negative (positive) earnings surprises where the analyst consensus forecasted earnings are above (below) the actual reported earnings for the current fiscal year end. The analyst consensus forecasted earnings are measured 6 months after the previous fiscal year end. All t-statistics are based on White (1980) heteroskedasticity consistent standard errors.

Panel A: Negative earnings surprise					*Panel B: Positive earnings surprise*				
	GS1	*GS2*	*GS3*	*GS3-1*		*GS1*	*GS2*	*GS3*	*GS3-1*
Excess return	0.020	0.016	0.009	−0.011	Excess return	0.019	0.018	0.017	−0.002
	(3.976)	(3.386)	(1.975)	(−3.908)		(3.356)	(3.298)	(3.049)	(−0.596)
Intercept	0.002	0.000	−0.010	−0.011	Intercept	0.002	−0.001	−0.001	−0.003
	(0.858)	(0.010)	(−6.001)	(−4.498)		(0.713)	(−0.427)	(−0.402)	(−0.933)
MKT	1.069	0.953	1.108	0.038	MKT	1.032	1.052	1.174	0.141
	(16.995)	(17.031)	(24.036)	(0.525)		(14.422)	(17.432)	(18.744)	(1.816)
SMB	0.987	0.888	0.939	−0.049	SMB	0.916	1.165	0.900	−0.016
	(9.024)	(17.985)	(17.287)	(−0.480)		(11.152)	(18.508)	(13.032)	(−0.190)
HML	0.022	−0.216	0.273	0.251	HML	−0.402	−0.268	−0.349	0.053
	(0.172)	(−1.041)	(3.180)	(1.493)		(−1.969)	(−2.031)	(−2.331)	(0.456)
AdjR^2	0.784	0.796	0.856	0.036	AdjR^2	0.686	0.841	0.796	0.000

gests that the phenomenon is not sensitive to the state of the market and investors' marginal utility of wealth. Given these findings, we argue that the return predictability pertaining to changes in borrowing is not pervasive across the entire cross-section of the stock market, is not likely to be attributed to unidentified sources of systematic risk, and is not a new and independent stock market 'anomaly'. Instead, it is a manifestation of negative price response following earnings disappointment among companies where investors tend to have greater difficulty in valuation and are likely to commit judgmental errors.

Our results have implications to practitioners and market efficiency. The end users of our findings may include existing shareholders, prospective investors and financial managers of small-cap growth companies. In carrying out a health check of their portfolios, changes in borrowing would serve as a useful indicator to existing shareholders seeking to avoid wealth loss. To speculative investors, this indicator can be exploited to facilitate the selection of stocks suitable for short selling. For financial managers, this increases their incentive to influence either the expected or reported earnings and it also offers insight to the reason behind this common but controversial practice. The observation that accounting-based information available in the financial statements such as changes in borrowing can predict returns is inconsistent with the semi-strong form of market efficiency. We demonstrate that this is confined among small-cap growth companies which existing literature suggests are more difficult for investors to value. Our evidence also supports the argument that investors' systematic judgmental errors may result into empirical return regularities in the stock market. Other avenues of further research that stem from our study include the value relevance of non-earnings based accounting variables and investors' price-response behaviour.

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An empirical investigation of 'closeness to cash' as a determinant of earnings response coefficients

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Abstract—'Closeness-to-cash,' specified in terms of the extent that earnings approximate operating cashflows, is frequently advanced as a desirable property of earnings. We consider whether the security price response to unexpected earnings, as indicated by the earnings response coefficient (ERC), depends on the extent that earnings are historically close to operating cashflows. Using a sample of 1993–1999 quarterly earnings announcements, we find that the ERC varies inversely with the relative (size-adjusted) absolute magnitude of the accrual component of quarterly earnings after controlling for other well-documented determinants of ERC. Such results support the closeness-to-cash property of a firm's earnings time series as an important ERC determinant.

1. Introduction

The proposition that some earnings are of higher quality than others is advanced both in the popular press and in financial analysis textbooks. Concerns about properties of reported earnings have increased in recent years due to several high-profile cases of accounting irregularities and increased awareness of earnings management.[1] Attributes of reported earnings that are valued by investors have been examined by several studies (Kormendi and Lipe, 1987; Easton and Zmijewski, 1989; Collins and Kothari, 1989). For example, earnings persistence, a concept often advanced as a valuable characteristic of reported earnings, is investigated extensively as a determinant of how investors respond to earnings innovations. Similarly, earnings predictability, also considered an indicator of earnings quality, is addressed in academic research (e.g., Lipe, 1990), although less extensively than earnings persistence.

The objective of this paper is to investigate whether stock price responses to earnings announcements are conditional on another popular earnings attribute, namely the extent to which earnings are close to operating cashflows. The premise that 'closeness-to-cash' is a desirable earnings attribute is common among analysts, scholars, and policy-making bodies. As examples, some security analysts claim that 'earnings that can be taken right to the bank and deposited' are high-quality earnings (McConnell, 2001). The Financial Accounting Standards Board (FASB) advances a similar view in the discussion of 'real earnings' and states that real earnings normally fall between accounting net income and cashflow from operations less amount of any nonrecurring or unusual items included therein and their related tax effects (FASB 1975). Such views suggest that earnings that are closer to cashflows, or since earnings comprise accruals and cashflows, earnings that include relatively small amount of accruals are more substantive economically than those containing a large amount of accruals (holding earnings constant).

A related notion that analysing earnings involves distinguishing between accrual and cashflow components is discussed in textbooks (e.g., Bernstein, 1993), teaching materials (e.g., Hawkins, 1988), and the popular press.[2] Financial analysts frequently question the quality of earnings when the gap between income and cash flows is large (Fink, 2003). Questions have been raised in academic literature about earnings that substantially deviate from cash flows. Richardson et al. (2002) examine 225 firms that had been forced to restate their financial results between 1971 and 2000. They find companies that tended to have poor quality earnings had previously reported substantially larger accruals than a control group of firms. Another re-

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[1] For example, SEC chairman Levitt (1998) expresses concerns about earnings management.

[2] See Sloan (1996) for discussions of the related literature.

lated notion, the accumulation of accounting earnings without commensurate accumulation of free cash flows is examined as a leading indicator of poor future earnings by Hirshleifer et al. (2004). They argue that net operating assets reflect the accumulation of earnings and cash flows and thus are likely to be more comprehensive in prediction in contrast to current accruals that represent single period slices of net operating assets. Thus, not only current but also past accruals appear important in evaluating the prospects of a firm.

This study investigates whether the magnitude of the earnings response coefficient (ERC) is conditional on the extent that past earnings are close to past operating cashflows. It is important to understand that the objective of the study is *not* to determine whether current period cashflows or accruals are more substantive economically or whether a specific earnings component is more or less informative than another. Rather, we investigate whether investors, when they receive information about unexpected *earnings* (but not necessarily cashflows), consider a firm-specific historical property of the earnings time-series, which we designate 'closeness-to-cash.' Past research considers other determinants of earnings response coefficients, but no study considers the relationship between price reaction to earnings and the closeness between earnings and cashflows.

Using a sample of 1993–1999 quarterly earnings announcements, we find that the three-day price reaction to earnings announcement varies directly with 'closeness-to-cash', measured as the relative magnitude of the accrual component of earnings. We also find that the known determinants of ERC, such as earnings persistence, earnings predictability, and growth opportunities, are related to ERC as predicted, but the association between ERC and the magnitude of accrual component remains significant after controlling for these factors. Finally, we demonstrate that the association is attributable to the history of how earnings compares with cashflows, and not to potentially spurious relationships between the closeness-to-cash metric and the cash-versus-accrual composition of current earnings.

The remainder of the paper is organised as follows. Section 2 explains the methodology. Section 3 describes data collection procedures. Results are reported and discussed in Section 4. Concluding remarks are in Section 5.

2. Methodology

2.1. Magnitude of accruals

The data analysis is designed to determine whether and how security price reactions to quarterly earnings announcements (ERCs) depend on *past* information about earnings and cashflows, particularly the extent that past earnings diverge from past cashflows. Our approach parallels that of studies that condition ERC on earnings persistence (Kormendi and Lipe, 1987; Easton and Zmijewski, 1989; Collins and Kothari, 1989). In particular, following prior studies that use the properties of earnings time series to assess earnings persistence, we use the time-series of quarterly earnings and accruals to measure the extent that prior earnings and cashflows differ, and then we condition ERC on the resulting measure.

Specifically, since accruals indicate the difference between earnings and cashflows, the history of absolute accruals indicates the 'closeness to cash' property that is the focus of the investigation. Thus, we compute $ACCR_{i,t}$ as the sum of the absolute value of quarterly accruals (see below) scaled by the sum of quarterly revenues, using all observations available to quarter t-1.[3] We use data from the post-*FAS95* period 1993–1999, and therefore, we are able to compute accruals using cashflow statements.[4] For the primary analysis tabulated and reported in this paper, *ACCR* is computed as income before extraordinary items [COMPUSTAT quarterly item 76] less operating cashflows [108]. We also compute and consider in our analysis *ACCR* defined as current accruals, which are –(decrease in accounts receivable [103] + decrease in inventory [104] + increase in account payables and accrued liabilities [105] + increase in accrued income taxes [106] + net change in other assets and liabilities [107]). Notice that, in contrast with total accruals, current accruals exclude long-term accruals (depreciation, deferred taxes) and 'non-operating' accruals (merger costs, restructuring charges, or gains/losses from asset sales).[5] We scale accruals using revenues because they are more comparable across firms than other possible deflators. For example, total assets are affected by cross-sectional differences in asset and expense recognition methods (e.g., the treatment of R&D investment).

2.2. Regression specifications

We use the following specification to address the null hypothesis that ERCs are invariant to the 'closeness-to-cash' property.

$$CAR_{i,t} = \gamma_0 + \gamma_1 UE_{i,t} + \gamma_2 ACCR_{i,t} * UE_{i,t} + \varepsilon_{i,t}, \qquad (1)$$

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[3] This measure, which can be considered a value-weighted (as opposed to equally-weighted) measure of accruals, is used to mitigate one extreme quarter's observation affecting the time-series average of accrual/sales. Accruals and sales enter into the computation of *ACCR* only when both variables are available.

[4] The fact that COMPUSTAT reports quarterly cashflow statements on cumulative bases is taken into account when computing accruals and cashflows using quarterly COMPUSTAT.

[5] The exclusion of non-recurring items is consistent with the convention used in publicly-available EPS forecast databases (*First Call* Historical Database User Guide 1999.)

where $CAR_{i,t}$ is the quarter t abnormal return cumulated over the three-day window centered at the earnings announcement date, and $UE_{i,t}$ is unexpected quarter t earnings per share (analyst forecast error computed using the most recent consensus forecast prior to the EAD scaled by split-adjusted stock price per share two days prior to the earnings announcement).

The interaction $ACCR_{i,t}*UE_{i,t}$ considers how interpretations of unexpected earnings are affected by the history of the closeness of earnings to operating cashflows. In particular, failure to reject $\gamma_2=0$ suggests that the stock price response to earnings is invariant to the extent that past cashflows diverge from past earnings. On the other hand, $\gamma_2<0$ indicates that the extent investors discount earnings innovations varies directly with the extent that the historical earnings diverge from cashflows. That is, unexpected earnings are presumed to be more substantive when the time series of earnings indicates that earnings are historically close to operating cashflows. Note that $\gamma_2>0$ indicates the opposite.

It is useful to contrast the short-window specification (1) with specifications – typically applied in a long-window context – that are designed to evaluate the value-relevance of cashflows (or accruals) versus earnings (e.g., Rayburn, 1986). In particular, consider the following specification (Rayburn, 1986; Ali, 1994; Pfeiffer, Elgers, Lo, and Rees, 1998).[6]

$$CAR_{i,t} = a_0 + a_1 UE_{i,t} + a_2 UACC_{i,t} + v_{i,t}, \qquad (1a)$$

where CAR is the long-window stock return and $UACC$ is unexpected accruals. Applications of specification (1a) require that the event period encompass the disclosure of both independent variables UE and $UACC$. Existing studies indicate positive estimates on UE and negative estimates on $UACC$, which implies that accrual components are less substantial than cashflow components of earnings.

Understanding subtle differences between specification (1), which is the focus of this paper, and specification (1a) is critical to the design. Studies that consider (1a) presume that CARs are affected by *unexpected, current-period* earnings and accruals, and that prior realisations are relevant only to form expectations. On the other hand, specification (1) is designed to investigate whether and how past information bears on the parameter a_1. In particular, the underlying premise is that a_1, which indicates how investors value unexpected earnings, is affected by *historical* relations between earnings and cashflows, with or without the knowledge of current-period accruals. Moreover, current-period *signed* accruals are in specification (1a) as a main effect, and therefore, negative estimates on accruals documented in prior studies support the premise that accruals are valued less than operating cashflows because of uncertainty about whether accruals will be realised in the future as cashflows. In contrast, specification (1) includes the history of the *absolute magnitude* of accruals as an interaction with unexpected earnings. Thus, the firm's 'closeness to cash' profile is considered as a determinant of how unexpected earnings are interpreted by market participants. If the firm routinely reports earnings that approximate cashflows, then market participants presume current unexpected earnings to be comprised primarily of cashflows, and unexpected earnings are interpreted more favourably than when the divergence between earnings and cashflows is substantial. Finally, specification (1a) may not generally apply to announcement dates. Specifically, in most cases the cashflow statement is not available at the time of earnings announcement, and therefore, unexpected accruals cannot be measured (Wilson, 1986, 1987; Bernard and Stober, 1989).[7]

2.3. Extended specifications

A firm's ERC is affected by firm-specific and time-specific factors other than its closeness-to-cash profile. Spurious relationships potentially obtain when such factors are correlated with $ACCR$ and are omitted from the specification. We consider the following model to consider determinants of ERC documented in prior studies.

$$CAR_{i,t} = \gamma_0 + \gamma_1 UE_{i,t} + \gamma_2 ACCR_{i,t} * UE_{i,t} + \sum_{j=1}^{8} \beta_j * X_{i,t}^j * UE_{i,t}^j + \varepsilon_{i,t} \qquad (2)$$

Precise definitions for the variables are in Exhibit 1. Notice that the terms

$$\sum_{j=1}^{8} \beta_j * X_{i,t}^j * UE_{i,t}^j$$

are interactions, where $X^j_{i,t}$(j=1 to 8) represent eight determinants of ERC; namely, absolute value of unexpected earnings ($|UE|$), earnings persistence (*PERS*), earnings predictability (*PRED*), discount rate (*DISCRATE*), book-to-market ratio (*B/M*), log of firm size (*LOGSIZE*), an indicator variable denoting whether the observation is a loss (*LOSS*), and whether the observation is a fourth quarter earnings announcement (*QTR4*). Motivations for including these variables are described below. As with $ACCR$, the control variables are measured using information available to investors prior to earnings announcement.

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[6] Specifications expressing returns on earnings and cashflows, returns on accruals and cashflows, returns on earnings and accruals are equivalent to (1a).

[7] In Section 4.2, we discuss the implications of evidence by Chen et al. (2002) that firms release balance sheet details in about 37% of quarterly earnings press releases.

Exhibit 1
Variable definitions

Variable	*Definitions/measurement*
$CAR_{i,t}$	Cumulative 3-day market model prediction errors centered at the quarter t earnings announcement date (EAD), i.e., returns from day –1 to day +1 of EAD.
$UE_{i,t}$	Analyst's split-adjusted EPS forecast error taken from *First Call* scaled by split-adjusted stock price per share two days before the EAD.
$ACCR_{i,t}$	Size of the accruals: Ratio of $\sum_{j=t-1}^{t-N} \lvert ACC \rvert \text{ to } \sum_{t-1}^{t-N} SALES,$ where *ACC* is total accrual per share and *SALES* is total sales per share, estimated using all observations up to the preceding quarter (t-1).
$PERS_{i,t}$	Slope coefficient (ϕ_1) from seasonal AR(1) model, $X_t = \phi_0 + \phi_1 X_{t-4} + \eta_t$, where X_t is split-adjusted earnings per share before extraordinary items and discontinued operations, estimated using all observations up to the preceding quarter.
$PRED_{i,t}$	Sample standard deviation of seasonal AR(1) model errors ($\sigma(\eta_t)$).
$DISCRATE_{i,t}$	Discount rate = expected rate of return on equity i, measured from the Fama-French (1995) 3-factor model using monthly stock returns up to 60 months preceding the EAD.
$B/M_{i,t}$	Book value of equity divided by market value of equity as of the prior fiscal quarter end.
$LOGSIZE_{i,t}$	Log of total assets at the prior fiscal quarter end (t-1).
$LOSS_{i,t}$	An indicator variable set = 1 if the actual EPS is a loss, 0 otherwise.
$QTR4_{i,t}$	An indicator variable set = 1 if the observation is from the fourth quarter, 0 otherwise.

2.3.1. Earnings persistence

A positive association between earnings persistence and ERC is supported both by theory and empirical evidence (Kormendi and Lipe, 1987, Easton and Zmijewski, 1989, Collins and Kothari, 1989).[8] As in Lipe et al. (1998), we measure earnings persistence using a seasonal AR(1) model.[9]

$$X_t = \phi_0 + \phi 1X_{t-4} + \eta_t, \tag{3}$$

where Xt is split-adjusted earnings per share before extraordinary items and discontinued operations. We estimate equation (3) using all available earnings up to quarter t-1.[10] The estimate for the slope coefficient (ϕ_1) indicates earnings persistence.

2.3.2. Absolute value of unexpected earnings

Freeman and Tse (1992) hypothesise that extreme values of unexpected earnings typically reflect transitory earnings shocks. Since transitory earnings are discounted relative to persistent earnings, ERC for observations with extreme unexpected earnings tends to be lower. This phenomenon imposes a non-linear S-shaped returns-earnings relation (Freeman and Tse, 1992; Cheng, Hopwood, and McKeown, 1992; Lipe et al., 1998). Following Freeman and Tse (1992) and Lipe et al. (1998), we control for this non-linearity by including $|UE_{i,t}|*UE_{i,t}$ in the specification. This tactic is comparable to including squared unexpected earnings (UE^2), except that the sign of the unexpected earnings is preserved.[11] If extreme *UE* are primarily transitory, then we anticipate a negative estimate on $|UE_{i,t}|*UE_{i,t}$.

2.3.3. Earnings predictability

Predictability of earnings is often considered an indicator of earnings quality (Brown and Sivakumar, 2001). The explanation is that earnings predictability indicates the extent that current earnings are correlated with future earnings (Lipe, 1990). Thus, ERC varies directly with earnings predictability. The sample standard deviation of forecast errors (η_t) from the seasonal AR(1) expression (3) is used to measure earnings predictability. We expect that ERC varies directly with earnings predictability, and thus, inversely with η_t.

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[8] If earnings time series has a high persistence, current-period earnings innovations are more substantive economically, and thus, ERCs are greater.

[9] Foster's (1977) model yields comparable results, but leads to a smaller sample size because of the need for seasonal differencing.

[10] We require a minimum of eight quarterly observations to estimate expression (3).

[11] Das and Lev (1994) report that arctan and absolute value models produce similar results in addressing non-linearity of ERC.

2.3.4. Discount rate

In theory, ERC varies inversely with the expected rate of return on equity, which in turn, varies directly with the firm's systematic risk (Collins and Kothari, 1989; Easton and Zmijewski, 1989). In this study, we use the Fama-French (1995) three-factor model to estimate the expected rate of return.

$$R_{i,t} - R_{f,t} = b_i(R_{m,t} - R_{f,t}) + s_i(SMB_t) + h_i(HML_t) + e_{i,t}, \tag{4}$$

where $R_{i,t}$ is monthly rate of return of security i for month t; $R_{f,t}$ is the monthly return on the risk free asset (one-month US Treasury bill yield for time t); SMB_t is the difference between the monthly return on small-cap stocks and large-cap stocks; HML_t is the difference between the monthly return on high book-to-market stocks and low book-to-market stocks. The expected cost of equity, denoted *DISCRATE*, is the sum of the products of the firm-specific coefficients estimates obtained from (4) and the historical mean rate of return for the three factors. We expect that ERC varies inversely with *DISCRATE*.

2.3.5. Growth opportunities, firm size, accounting losses, and fourth quarter disclosures

Collins and Kothari (1989) argue that time-series based earnings persistence measures are inadequate proxies for economic growth opportunities reflected in responses to current earnings. The reason is that time-series estimates presume stationarity over long periods, and thus, cannot capture dynamic growth opportunities that evolve over time. Following Collins and Kothari (1989), we consider the book-to-market value of equity ratio (*B/M*), calculated at the beginning of quarter t, as a proxy for the extent that growth opportunities comprise firm value. We expect that ERC varies inversely with B/M.

Differences in the information environment affect the extent to which price changes anticipate earnings (Freeman, 1987; Collins and Kothari, 1989). Firm size is often used to indicate the extent that earnings are anticipated. The underlying reasoning is that large firms are followed more closely than small firms such that investors are better informed about large firms prior to earnings announcements. If so, then earnings announcements are less consequential for large, than for small, firms. However, firm size is correlated with firm-specific attributes such as risk and growth and this may compound the relationship between size and price reaction to earnings. Thus we do not specify an expected sign for the size variable. Following Collins and Kothari (1989), we use the natural log of total assets at the end of quarter t-1 (*LOGSIZE*) to measure firm size.[12]

Prior studies indicate that the magnitudes of security price reactions to unexpected accounting losses tend to be lower than reactions to positive earnings (Hayn, 1995, Basu, 1997). Thus, we specify the indicator variable *LOSS* set equal to one for negative quarterly earnings, and to zero, otherwise.

Finally, because fourth-quarter earnings are more volatile and more difficult to forecast than interim earnings (e.g., Bathke and Lorek, 1984; Collins et al., 1984), the ERC tends to be smaller for fourth quarter announcements (Lipe and Bernard, 2000). We therefore include *QTR4*, an indicator variable set equal to one for fourth quarter observations; zero, otherwise.

Finally, we enter all determinants of earnings response coefficients as industry-adjusted (i.e., as deviations from the respective industry means) to control for industry effects. We also include the explanatory variables as main effects (i.e., *X*'s without interactions).

3. Data

Using the *First Call* earnings forecast database, we compute analyst forecast error (*FE*) as *FE* = (actual EPS – forecast EPS), where forecast EPS is the most recent consensus (mean) quarterly earnings forecast made before the earnings announcement. To ensure consistency in computing *FE*, actual EPS also is from *First Call*.[13] We restrict our analysis to forecasts issued within 90 calendar days prior to the earnings announcement date (EAD), except for the fourth quarter where we impose a 100-day restriction.[14]

Table 1 summarises the sample identification process. The *First Call* data contain 78,239 fiscal 1993 to 1999 one-quarter-ahead forecasts. From this set, we remove observations in the following sequence. First, we remove 12,104 observations (15.4%) because split-adjustment factors from *First Call* or COMPUSTAT are missing, or do not match. Both forecast and actual EPS in *First Call* are split-adjusted retrospectively, and therefore, matching the split-adjustment factors is necessary in order to properly align COMPUSTAT and *First*

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[12] Results are comparable when LOGSIZE is specified as log market value of equity.

[13] Actual EPS from the COMPUSTAT file are generally not comparable with forecast EPS recorded in First Call or IBES when analysts use EPS definitions that differ from what is reported by COMPUSTAT. As examples, analysts can ignore unusual items that are considered as earnings components in COMPUSTAT (Philbrick and Ricks, 1991).

[14] We allow 10 more days because fourth quarter announcements tend to be later by an average of 10 days than in other quarters. For example, mean (median) days between the fiscal-quarter-end and the EAD are 36 (35) for the 4th quarter, compared with 26 (24) for the quarters 1, 2, and 3.

Table 1
Sample selection procedure

Description	*Firm-quarters*
Firm-quarters recorded in both First Call and COMPUSTAT during 1993~1999.	78,239
Eliminations due to:	
1. Split-adjustment factors missing or not aligned between COMPUSTAT and *First Call*	12,104 (15.4%)
2. EAD (earnings announcement date) recorded in *First Call* differs from EAD recorded in COMPUSTAT by more than one trading day	4,975 (6.3%)
3. Three-day excess return or stock price two days before the EAD is missing	983 (1.2%)
4. Stock price is less than one dollar	87 (0.1%)
5. Potentially misleading zero forecast errors (note 1)	2,710 (3.4%)
Total eliminations	**20,859** **(26.6%)**
• Total firm-quarters used (5,829 firms)	57,380
• Firm-quarters for which all control variables are available.	35,033

Note 1: Zero forecast errors are potentially misleading if the split adjustment factor exceeds 1.0 (Baber and Kang, 2002).

Call data. Second, we identify and cross-verify COMPUSTAT versus *First Call* earnings announcement dates.[15] Manual verification of some disparities indicates that neither the COMPUSTAT nor the *First Call* EADs are conclusively reliable, and thus, we remove 4,975 observations (6.3%) where EADs differ by more than a trading day. Because EADs are potentially misaligned by one day, we use three-day CAR (days –1, 0, and +1) as the primary security response metric.

Following conventional procedures, we estimate the market model from 170 to 21 days prior to the EAD and use the parameter estimates to compute abnormal returns and cumulative abnormal returns (CAR). We remove 983 observations that lack three-day excess returns around the EAD, or stock price two-days prior to the EAD (the deflator for UE). Next, we remove 87 observations that have stock price less than one dollar. Finally, we remove 2,710 (3.4%) zero UE observations where the split factor is greater than one. The reason is that zero forecast errors observations are potentially inaccurate when the firm executes stock splits (Baber and Kang, 2002).

In sum, we remove 20,859 (26.6%) observations to obtain a sample of 57,380 observations, for which the basic ERC specification (1) can be estimated. More comprehensive analyses (expression (2)) require additional explanatory variables; therefore, actual sample sizes are smaller owing to missing data required to compute variables. Specifically, the sample size ranges from 30,099 to 35,033 depending on whether control variables are included.[16]

The distribution of the $|UE|$ metric, displayed as Table 2, indicates that analyst forecast errors are small relative to stock prices. For example, about 88.8% of analyst forecast errors are within 1% of stock price, and 98% of them are within 5% of stock price. For comparison, the distribution of time-series forecast errors (not reported) indicates 68% of errors within 1% of stock price and 92% within 5% of stock price. The superior accuracy of analysts relative to time-series models is well documented (e.g., Brown, et al., 1987), but evidence is inconclusive about whether analysts' forecast errors are more highly correlated with security returns at the EAD (e.g., O'Brien, 1988). Thus,

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[15] We use 'system input date' reported in First Call as the EAD. The 'earnings release dates' in First Call exhibit greater disparity with the COMPUSTAT EAD (only 62% are within one day of COMPUSTAT EADs). After checking some of the EAD differences manually, we conclude that the First Call's 'system input date' is more reliable than the 'earnings release date'.

[16] While this is a significant reduction in the sample size from the overall sample, this is comparable to other papers in the literature that use cash flow and accrual data over several years. For example, McNichols (2002) uses 15,015 firm-year observations over 1988–1998 in studying quality of accruals and earnings.

Table 2
Distribution of |*UE*| – magnitude of analyst forecast errors (*FE*) scaled by stock price two days prior to the EAD

UE range (% of price)	*Frequency*	*% of sample*	*Cumulative %*
0.0~1%	50979	88.8	88.8
~2%	3236	5.7	94.5
~3%	1116	1.9	96.4
~4%	572	1.0	97.4
~5%	388	0.7	98.1
~6%	255	0.5	98.5
~7%	144	0.3	98.8
~8%	111	0.2	98.9
~9%	92	0.2	99.0
9%~10%	76	0.1	99.1
10%~15%	170	0.3	99.5
15%~20%	76	0.2	99.7
20%~30%	79	0.1	99.8
30%~40%	33	0.1	99.9
40%~50%	14	0	99.9
50%~60%	9	0	100
60%~70%	7	0	100
70%~80%	1	0	100
80%~90%	2	0	100
90%~100%	3	0	100
<100%	17	0	100
Total	**57,380**	**100%**	**100%**

while some studies use analyst forecast errors (e.g., Lipe, et al., 1998), others employ time-series errors in relating stock returns to unexpected earnings (e.g., Teets and Wasley, 1996). It is important in this study to use the *UE* metric that has the higher correlation with stock returns; and therefore, we compare correlations between forecast errors and EAD security returns (ERC) for analyst versus time-series forecast errors.

Table 3 displays estimates of ERC computed using analyst forecast (AF) and time-series (TS) errors. The first two columns report estimates using the full sample. From the statistics displayed in the last row of the Table, notice the extreme observations for both AF and TS errors. For example, the largest TS forecast error exceeds 100 times the market value of the firm. Including extreme observations yields a negative ERC for time-series forecasts (column 1, –0.0008). Thus, we remove the top and the bottom percentile of the *UE* distribution to obtain the results displayed as columns (3) through (6) of the Table.

The superiority of AF errors over the TS errors as a proxy for the market's expectations is striking. In particular, analyst forecasts yield ERC = 1.598 (column 4), which is more than eight times the ERC = 0.179 obtained using time-series forecasts (column 3). R^2 and the associated t-statistics are also substantially higher. ERC from AF suggests that, on average, one dollar of unexpected earnings yields a $1.60 increase in stock price, whereas the ERC from TS errors implies that one dollar of unexpected earnings translates into less than a dollar ($0.18) increase in stock price. We attribute this difference to greater error in specifying unexpected earnings from TS forecasts than from AF. The last two columns address a model that includes the interaction (*UE**|*UE*|) to adjust for non-linearity in the earnings-price relationship (Lipe et. al, 1998). Consistent with Freeman and Tse (1992) and Lipe et al (1998), ERCs from both AF and TS errors increase to 3.71 and 0.42 respectively after considering non-linearity.

Based on the preceding analysis, we use AF to compute unexpected earnings, and we remove observations from the top and the bottom one percent of the distribution of analyst forecast errors (*UE*), and other independent variables *ACCR*, *PERS*, *PRED*, *DISCRATE*, and *B/M*. Table 4 presents summary statistics for the variables *prior to removing extreme observations*.

4. Results

4.1. Primary findings

Table 5 shows estimates for specifications (1) and (2). The first column indicates how each factor affects ERC without considering the other fac-

Table 3
ERC comparisons between seasonal random walk time series (TS) forecast and analyst forecast

$$CAR_{i,t} = \gamma_0 + \gamma_1 UE_{i,t} + \gamma_2 UE^*|UE|_{i,t} + \varepsilon_{i,t}$$

(t-statistics in parentheses)

	Full Sample[1]		*Middle 98%*[2]			
Dependent Variable	*Time Series errors (1)*	*Analyst errors (2)*	*Time Series errors (3)*	*Analyst errors (4)*	*Time Series errors (5)*	*Analyst errors (6)*
Intercept	0.0021	0.0022	0.0020	0.0027	0.0015	0.0016
	(5.87)	(6.19)	(5.53)	(8.09)	(4.31)	(4.23)
UE	–0.0008	0.0642	0.179	1.5984	0.421	3.710
	(–2.20)	(7.67)	(13.29)	(34.20)	(15.23)	(39.31)
UE|UE|*					–2.597	–68.915
					(–10.01)	(–25.70)
Adj. R^2	0.0000	0.001	0.0038	0.024	0.0062	0.0357
N	49,073	49,073	47,398	47,398	47,398	47,398
Statistics for UE						
Mean	–0.0101	–0.0020	–0.0000	–0.0004	–0.0000	–0.0004
Std. dev.	0.9003	0.0620	0.0279	0.0078	0.0279	0.0078
Min.	–100.732	–9.7710	–0.2006	–0.0646	–0.2006	–0.0646
Max.	44.0787	1.3002	0.1487	0.0324	0.1487	0.0324

Notes:

[1] The 'Full Sample' is an intersection of all observations of *UE*s based on analyst forecasts compiled by *First Call* and those based on seasonal random walk model.

[2] The 'Middle 98% Sample' is an intersection of the middle 98% of *UE*s based on analyst forecasts and the middle 98% of *UE*s based on seasonal random walk model.

tors. In particular, results in the second row of column 1 are for the bivariate specification (1), which includes both *UE* (3.7860) and *ACCR*UE* (–2.5119). Results for other variables indicate the estimate for a bivariate specification with that variable substituted for *ACCR* in specification (1). For example, the estimate in the fifth row of column 1 for *PERS*UE* (0.3347) is for a bivariate regression of returns on *UE* and *PERS*UE*. Column 2 reports estimates for the full specification (2). All specifications in columns (2) and (3) include the main effects (i.e., *X*'s). Estimates for these variables are not tabulated for brevity.

Observe that signs of the estimates are consistent across the various approaches, but standard errors and significance levels vary. Most estimates from the bivariate regressions in column 1 – in particular, estimates for interactions *ACCR*UE*, *PERS*UE*, *B/M*UE*, *LOGSIZE*UE*, *LOSS*UE*, *QTR4*UE*, *|UE|*UE* – are statistically significant (one-tailed $\alpha < 0.01$) with the predicted sign. Magnitudes of the estimates and the significance levels typically decline when all interactions are considered jointly (column 2). This is particularly true for persistence (*PERS*UE*), growth (*B/M*UE*), and size (*LOGSIZE*UE*) where t-statistics are 3.82, –3.85 and 4.68, respectively, when each variable is considered alone (column 1); but 1.22, –1.63, and 0.86 when all variables are included (column 2).

On the other hand, the estimate for *ACCR*UE* is consistently negative and highly significant in all specifications. To illustrate the economic significance of the relation, the estimate for *ACCR*UE* of –1.5748 (t=–3.54; column 2), implies that the security price response to each dollar of earnings surprise (*UE*) is lower by $0.157 if the accruals-to-sales ratio is greater by 0.1. Note that this interpretation applies to the reduced sample used in the regression model in Table 5 and thus not necessarily indicative for the whole sample of firms.

Parameter estimates on other determinants of ERC are generally consistent with theoretical predictions and with prior literature. Using the results in column 2, the price reaction to earnings varies inversely with book-to-market (*B/M*, –0.2665, t=–1.63). Firm size (*LOGSIZE*, 0.0379, t=0.86) is not significant, however. Consistent with results

Table 4
Summary statistics[1]

Variable	*Mean*	*Std. dev.*	*Min.*	*1.0%*	*Median*	*99.0%*	*Max.*
CAR *(3-day excess return)*	0.0018	0.0799	−1.0073	−0.2368	0.0094	0.2352	1.3894
UE *(analyst forecast errors)*	−0.0004	0.0078	−0.0646	−0.0370	0.0003	0.0186	0.0324
ACCR *(|total accruals|/|sales|)*	0.2099	1.4364	0.0062	0.0244	0.1052	1.6452	12.4645
PERS *(persistence)*	0.3370	0.6032	−17.5807	−1.0914	0.2674	1.6161	7.9363
PRED *(std. dev. of TS forecast error/stock price)*	0.6064	1.2714	0.0001	0.0024	0.1709	6.9975	12.0833
DISCRATE *(Fama-French risk factor)*	0.1704	0.0845	−0.9299	−0.1349	0.1645	0.5001	1.4582
B/M *(book-to-market)*	0.5020	0.3587	−5.9425	−0.1063	0.4452	1.6533	6.6774
LOGSIZE *(logsize)*	6.2367	1.8656	−0.9761	2.6909	6.1222	11.0427	13.4453

Note 1: See Exhibit 1 for variable definitions.

reported elsewhere, ERC is smaller by −0.9397 (t=−6.42) when firms report a loss and by −0.4922 (t=−3.85) for fourth quarter earnings announcements.

Finally, results are comparable when the numerator of *ACCR* is defined as "current" accruals (*CACC*) only. More specifically, this measure yields a parameter estimate −2.02 (t = −2.99) for *ACCR*UE*. We obtain similar results when ranks (centiles) of *ACCR* are used rather than the raw *ACCR* (t=−2.66).

4.2. Additional tests

Next we consider whether relations in Table 5, column 2, for *ACCR* indicate the historic 'closeness-to-cash' property of earnings time series or whether they indicate security price responses to properties of current earnings. In particular, existing studies of earnings returns associations over long-windows typically indicate that accruals are discounted relative to cash components of earnings (Rayburn, 1986; Ali, 1994; Pfeiffer et al., 1998). Early studies also suggest that cashflow or balance sheet information, which can be used to estimate the cash versus accrual composition of earnings, is not available at the EAD (e.g., Wilson, 1986, 1987; Bernard and Stober, 1989). On the other hand, Chen et al., 2002 report that firms include balance sheet details in about 37% of quarterly earnings press releases issued between the fourth quarter of 1992 through the third quarter of 1995. In cases where details are reported, investors can use the accrual information to value unexpected earnings.

Thus, we are concerned about whether relations documented for *ACCR* indicate security price responses to information released with earnings that permits investors to distinguish cash from accrual components of current earnings. If investors can distinguish accruals from cash components at the EAD, and if the historical measure *ACCR* is correlated with information that facilitates this distinction, then relations in column 2 can be spurious. Thus, we consider the possibility that such information is released for at least a subset of firms, and if so, then whether effects of *ACCR* on ERC are subsumed by unexpected accruals.

To this end, we construct two measures of unexpected accruals, denoted *UACC*: (1) seasonal changes in accruals per share deflated by prior quarter-end stock price, and (2) forecast errors from the seasonal AR1 model (specification 3) of accruals per share deflated by prior quarter-end stock price. Forecast errors for the seasonal AR1 specification are expected to perform better than changes in accruals as indicators of *UACC*, and thus, we expect stronger results for the AR1 forecast errors.

Table 5, column 3 shows results when *UACC* is considered in the model. We require at least eight observations to estimate the seasonal AR1, and therefore, the sample size for column 3 is smaller

Table 5

ERC estimates using three-day cumulative abnormal returns centered at the earnings announcement date
(t-statistics in parentheses)

	Exp. Sign	*Individual Determinants (1)*	*Specification Excluding UACC (2)*	*Specification Including UACC (3)*	*Specification that reports Fama-McBeth Statistics (4)*
Intercept		–	0.0070	0.0089	–
			(3.32)**	(3.97)**	
UE	(+)	3.7860	4.2061	4.2389	4.1641
Unexpected Earnings		(36.68)**	(35.49)**	(34.82)**	(4.83)**
UACC	(–)	–0.0003	N.A.	–0.0003	–0.0003
Unexpected Accruals		(–1.69)*		(–1.70)*	(–1.05)
*ACCR*UE*	(?)	–2.5119	–1.5748	–1.7043	–3.0597
Magnitude of Accruals		(–5.86)**	(–3.54)**	(–3.34)**	(–2.27)**
*PERS*UE*	(+)	0.3347	0.1078	0.1713	0.1136
Earnings Persistence		(3.82)**	(1.22)	(1.77)*	(0.29)
*PRED*UE*	(–)	–0.0926	–0.1649	–0.1622	–0.1064
Earnings Predictability		(–1.95)*	(–3.28)**	(–3.11)**	(–1.85)*
*B/M*UE*	(–)	–0.5523	–0.2665	–0.1843	–0.1719
Growth (Book-to-Market)		(–3.85)**	(–1.63)*	(–1.06)	(–0.20)
*DISCRATE*UE*	(–)	–0.5155	–0.0925	–0.2816	–0.1264
Discount Factor		(–1.00)	(–0.18)	(–0.46)	(–0.21)
*LOGSIZE*UE*	(?)	0.1938	0.0379	0.0478	0.0165
Log of Total Assets		(4.68)**	(0.86)	(1.02)	(0.06)
*LOSS*UE*	(–)	–2.1151	–0.9397	–0.6429	–0.9990
Indicator for Loss		(–18.07)**	(–6.42)**	(–4.11)**	(–2.42)**
*|UE|*UE*	(–)	–77.3525	–58.9753	–68.4491	–64.8174
Non-linearity		(–23.44)**	(–14.33)**	(–15.32)**	(–5.02)**
*QTR4*UE*	(–)	–0.5698	–0.4922	–0.4325	–0.4577
Fourth Quarter Indicator		(–4.45)**	(–3.85)**	(–3.16)**	(–2.74**)
Adjusted R^2		N.A.	0.047	0.049	–
Sample size		35,033 (for UACC only 30,099 are used)	35,033	30,099	–

Notes:

1. In column (1), estimates for each variable *X* (*X*=|*UE*|, *ACCR*, *PERS*, *PRED*, *B/M*, *DISCRATE*, *LOGSIZE*, *QTR4*, or *LOSS*) are obtained from a bivariate regression of *CAR* on *UE* and X^{j}***UE*. The estimate for *UE* is from a bivariate regression of *CAR* on *UE* and |*UE*|. All independent variables enter as 'industry adjusted' i.e., transformed as deviations from their respective industry means.
2. Column (2) is estimated from specification (2):

$$CAR_{i,t} = \gamma_0 + \gamma_1\, UE_{i,t} + \gamma_2\, ACCR_{i,t} {*} UE_{i,t} + \sum_{j=1}^{8} \beta_j * X_{i,t}^{j} * UE_{i,t}^{j} + \varepsilon_{i,t},$$

   Explanatory variables are also included as main effects (not shown).
3. In column (3), *UACC* is forecast error from an AR1 specification of accruals per share, deflated by prior quarter-end stock price.
4. In column (4) Fama-McBeth (1973) parameter estimates and t-statistics are reported for the model that includes UACC.

than in column 2 (30,099 vs. 35,033).

The estimate for *ACCR* (magnitude of accruals) is negative and statistically significant (one-tailed $\alpha < 0.01$). Evidence in prior studies is that security price responses to earnings announcements are stronger (more positive) for unexpected cashflows than for unexpected accruals. The estimate for *UACC* is not statistically significant when *UACC* is specified as seasonal change in accruals (results not reported), but consistent with prior studies, the estimate on *UACC* is negative (–0.0003, t=–1.70) when UACC is specified as forecast errors from seasonal AR1 model. The negative estimate for *UACC* implies that the market responds to earnings as if some information about accruals (cashflows) is available at the time of earnings announcement. Notice that, if *UCFO* (unexpected cashflows) substitutes for *UACC*, then (by construction) the coefficient for *UCFO* is of the same magnitude but with an opposite sign. Thus, the result indicates that investors respond *positively* to unexpected cashflows after controlling for unexpected earnings, which is consistent with existing results (Rayburn, 1986; Wilson, 1987).[17] Finally, and to the primary objective of the study, the results indicate that the *history* of the accrual component ACCR impacts the ERC even when measures of current period unexpected accruals are also considered in the model.[18]

Finally, to address concerns that pooled regressions overstate the significance levels, Fama-McBeth (1973) statistics are reported in column 4, for the model that includes UACC. The statistics are computed using the mean and standard error of the regression statistics over the seven-year period 1993–1999. Comparing columns 3 and 4, it can be seen that the Fama-McBeth t-statistics are smaller in magnitude. The significance levels for UACC and UE*PERS are diminished but the significance levels of other variables including those of primary interest, UE and ACCR*UE, remain similar to column 3.[19]

5. Concluding remarks

We consistently reject the null hypothesis that security price reactions to quarterly earnings disclosures are unrelated to the firm-specific historical cashflow-versus-accrual composition of earnings. In particular, we document that ERC varies directly with the extent that the history of earnings indicates that earnings are close to operating cashflows. Furthermore, the economic and statistical significance of these associations are at least as substantive, if not more substantive than, associations for other known determinants of ERCs, such as earnings persistence or the cost of equity capital. Our analysis also indicates that the inverse relation is robust to competing explanations advanced in the literature.

These findings indicate that investors can use the historical 'closeness-to-cash' profile of earnings to inform both assessments of earnings quality and interpretations of current unexpected earnings. More specifically, earnings that 'can be taken right to the bank and deposited' – or earnings that contain smaller amount of accruals – are considered to be more substantive than earnings components created through the accrual process. We posit that accrual components are attributed lower quality owing to uncertainty about whether accruals will be realised as future cashflows. Such uncertainty presumably indicates concern about (1) random and unexpected business conditions that potentially compromise information gained through the accrual process, (2) unintentional estimation errors inherent to the accrual process, or (3) intentional earnings management.

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[17] Estimations of $CAR = a_0 + a_1UE + a_2UACC + \varepsilon$ and $CAR = b_0 + b_1UE + b_2UCFO + \varepsilon$ are equivalent since it can be shown that $b_2 = -a_2$; and $a_1 = b_1 + b_2$.

[18] Including interactions between *UACC* and the determinants of ERC indicates no significant coefficient on *UACC* or on variables interacting with *UACC*.

[19] To address concerns that the measurement of accrual variables may contribute to time-sensitive results, the pooled data is partitioned equally into two groups pertaining to earlier and later time periods. The parameter estimates are not significantly different between the two groups. For example, the estimates of UE*ACCR were –2.05 and –1.65 in the earlier and later periods.

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Deprival value and fair value: a reinterpretation and a reconciliation

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Abstract—Measurement is an important current issue for financial accounting standard-setters. Current values are increasingly replacing historical cost measures, but an important unresolved issue is the precise form that current value should take. In this paper two alternative measurement bases that have appeared in accounting standards, Deprival Value (sometimes called Value to the Business) and Fair Value, are explained and compared. They are then reconciled by making the following three adjustments to their conventional definitions.

(1) In the case of Deprival Value, situations in which net realisable value exceeds replacement cost imply that there is a profitable redevelopment or redeployment opportunity, so that net realisable value is regarded as the appropriate measure of Deprival Value.
(2) In the case of Fair Value, transactions costs (including installation and removal costs) are added to acquisition values and deducted from disposal values.
(3) In the case of Fair Value, it is assumed that net realisable value represents the 'highest and best use', except when it is exceeded by both replacement cost and value in use. In the latter case, 'highest and best use' (and therefore Fair Value) is inferred by assuming profit-maximising behaviour by the owner.

It is suggested that the resulting synthesis represents a method of current valuation which is consistent with the objective of measuring the asset in terms of the economic opportunities that are available to its current owner in the condition and location in which it is currently to be found.

1. Introduction

Measurement is an extremely important issue in financial reporting that has not been resolved by the conceptual frameworks of any of the leading standard-setters, such as those of the US Financial Accounting Standards Board (FASB), the International Accounting Standards Board (IASB) or the UK Accounting Standards Board (ASB). The principal reason for this is that financial reporting has traditionally been based on historical costs, whereas current values have only more recently started to be adopted in certain areas of financial reporting. These areas are ones such as the measurement of financial instruments, where current market values are acknowledged to be more reliable (because markets in these items are well developed) and relevant (because the values of the items may be subject to large fluctuations, rendering historical costs very poor proxies for current values). Thus, current financial reporting standards tend to contain a mixture of current and historical measures, with current measures tending to grow in importance, as markets develop and financial reporting evolves to meet the needs of users of accounts. The FASB and the IASB are currently revising and converging their conceptual frameworks and are intending to address measurement as an important part of this. A first step in this process was the recent publication by the IASB of a discussion paper on measurement, prepared by the staff of the Canadian Accounting Standards Board (2005).

The debate is not, however, simply about whether historical cost or current value should be used in financial reports. There is also considerable controversy as to how current value should be defined and measured. This paper attempts to make a positive contribution to this debate by comparing and reconciling the two principal competitors, deprival value and fair value. Deprival value has deep roots in the academic literature, and it is currently included in the conceptual framework of the ASB. Fair value is a more recent concept and has emerged as a term used in the standards of the FASB, the IASB and the ASB during the past 20 years, although it is not yet discussed in their conceptual frameworks. The FASB is currently developing a standard to clarify its definition of fair value (FASB, 2004 and 2005) and to provide guidance that will enable it to be implemented in a consistent way across the standards

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that have used the term. The IASB is considering adopting the FASB's proposals (IASB, 2005). Thus the definition and implementation of fair value is an important current issue in standard-setting. It is also a controversial one, possibly because of the relatively rapid introduction of fair value, a relatively new concept which has had little previous discussion. The present paper is intended to provide such a discussion, particularly by clarifying and extending the fair value and deprival value concepts and attempting to achieve a reconciliation of the two.

The use of current values in accounting has a long history in both academic debate and practice (see for example, Boer, 1966 and Tweedie and Whittington, 1984). The topic was central to the debates on inflation accounting that took place in the period between the late 1960s and the early 1980s and the form of current value that found its way into actual or proposed accounting standards at that time was current cost derived from the deprival value model.[1]

Deprival value was supported by an extensive academic literature, originating in several different countries and dating from the early part of the 20th century.[2] By the early 1980s it seemed to be emerging as the current value measurement methodology favoured by standard-setters. However, the 'current cost revolution' collapsed in the mid-1980s as a result of declining inflation rates and the scepticism of preparers of accounts about the efficacy of current cost accounting (Tweedie and Whittington, 1997). Deprival value, which was a central component of current cost accounting, therefore fell out of favour with standard-setters, although (in the guise of Value to the Business) it remains a feature of the *Statement of Principles* of the UK Accounting Standards Board (ASB, 1999, ch. 6).

In more recent times, demands have again surfaced for financial statements to portray current values, when they seem to be particularly relevant and can be measured reliably. The form of current value advocated in these developments has usually been described as fair value, and this has created the need for the new FASB standard on fair value measurement, which will promote consistency in its application across different existing standards. Fair value has been used within a mixed measurement system, more traditional methods, such as historical cost, being retained for those items for which fair value is considered to be unreliable or costly to measure, or is not considered to be especially informative. An important example of these developments is reporting for certain financial instruments, such as derivative securities, where the existence of deep and liquid markets and the obvious irrelevance of using historical cost to measure instruments traded on such markets (derivatives such as swaps may have a historical cost of zero, but may have large market values as a result of changes in market conditions since their inception) has led to the promulgation of accounting standards permitting or requiring current value measurement on a 'fair value' basis (FAS 115 and 133 in the US and IAS 39 in international standards).

Thus, fair value has entered certain accounting standards as a response to needs, on a standard-by-standard basis rather than as a result of a formal amendment to conceptual frameworks, and without extensive academic discussion such as that which preceded the introduction of deprival value. The change is therefore potentially confusing, and deprival value and fair value are often regarded as competing alternatives, without any consideration as to why this should be the case.

In this paper, we attempt to identify the common roots of these two approaches to current value, as well as the differences between them. In reconciling the two, we propose a synthesis which, we believe, combines the best features of both models. The purpose of this paper is therefore to bridge the apparent gap between the concepts of deprival value and fair value, and in doing so, to contribute to understanding the properties of both concepts.

Deprival value (alternatively, and possibly more appropriately, described as Value to the Business) asks the question: what would the owner of an asset lose if it were deprived of this asset? In other words, it is a measurement of the additional value accruing to the business as a result of owning the asset. This is the answer to Professor Baxter's question, 'What difference does it make?'(Baxter, 2003, p3). Deprival value is usually interpreted as implying measurement at replacement cost for an asset whose recoverable amount (the highest value obtainable from use or disposal) exceeds replacement cost. The reason for restricting the value of the asset to replacement cost, in these circumstances, is that the loss resulting from losing the asset should not be greater than the cost of replacing it and therefore making good the loss: equally, the value attributed to owning the asset should not exceed the cost of acquiring an equivalent asset in the market, because any excess returns generated by the present owner can be attributed to other assets specific to that owner, such as goodwill. Where recoverable amount is less than replacement cost, replacement of the asset would not be justified (that is, in replacement cost terms, it is impaired) and the asset is valued at its recoverable amount (which is, in this instance, lower than replacement cost). Thus, deprival value can be looked upon as being a modified replacement cost valuation, that is, replacement cost but subject to a recoverable amount test (Gee and Peasnell, 1976).

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[1] The most explicit example is the Report of the Sandilands Committee (1975), which precipitated the current cost debate in the UK and influenced it elsewhere. The Report of the Byatt Committee (1986) also adopted an explicit deprival value model and was influential in the adoption of current cost accounting by certain public sector enterprises and regulated entities.

[2] Whittington (1983:131-6) provides a brief survey of the early deprival value literature (described there as 'value to the owner') up to about 1980. Since then, the literature has extended further, notable contributions being the Byatt Report (1986) (see footnote 1), the book by Edwards et al., (1987) which demonstrates the relevance of deprival value to the detection of monopoly profits, and a paper by Stark (1997) which demonstrates how deprival value needs to be modified when real options (arising from the irreversibility of investments) are present.

As indicated earlier, deprival value has, in recent years, been replaced by fair value, as the current value measure favoured in accounting standards. This has been the case particularly in the standards of the US's FASB and the IASB. In the IASB's *Framework* (IASC, 1989), fair value is referred to but not defined.[3] However, it is defined in its standards, starting with *Property, Plant and Equipment* (IAS16, 1982), as 'the amount for which an asset could be exchanged between knowledgeable, willing parties in an arm's length transaction'. This is substantially consistent with the definition that emerged earlier in the literature of the US's FASB.[4]

The FASB interpretation of fair value has been explained and clarified in a series of articles in its *Understanding the Issues* series (particularly, Foster and Upton, May and June 2001) and more recently in the FASB Exposure Draft *Fair Value Measurements* (FASB, 2004) and the consequent Working Draft Statement of Financial Accounting Standards No 15X *Fair Value Measurements* (FASB, 2005). The FASB's interpretation is consistent with the guidance in IASB standards such as *Financial Instruments: Recognition and Measurement* (IAS 39, 2004) and *Business Combinations* (IFRS 3, 2004). The essential idea of fair value is that it is an arm's length market price. This requires that the assumptions as to how the asset can be used are those adopted by the market, rather than the 'entity specific' beliefs of the current owner. Also, it is a price rather than a realisable value or cost of acquisition, so that it does not make any allowance for transactions costs. In both of these respects, it differs from deprival value. Moreover the report of the IASC Steering Committee on Financial Instruments (IASC, 1997 chapter 7, 5.6) defined fair value as a selling price (the bid price) rather than a buying price. This was probably an arbitrary means of resolving the problem of how to treat the dealer's spread in financial markets, rather than an observation as to the fundamental properties of fair value, but it reinforced a trend by some advocates of fair value to regard it as a selling price. This trend has been further reinforced by the FASB's current discussions on a new fair value measurement standard, which seems likely to define fair value specifically as a selling price in the appropriate reference market. Since deprival value can, as we have seen, be regarded as modified replacement cost, the interpretation of fair value as a selling price opens up another potential gap between the two concepts.

As stated above, the purpose of this paper is to bridge the apparent gap between the two concepts. They are both approaches to obtaining an economically meaningful current value, and the deprival value approach can be used to resolve a problem that arises in the application of the fair value principle: the choice of market in which to assess fair value and, in particular, whether that should be the market for acquisition (entry) or disposal (exit). In order to achieve this reconciliation, we first examine deprival value, the concept with the longer history in the accounting literature, and suggest an amendment to its traditional interpretation. We then examine the more recent concept, fair value, and suggest a particular interpretation of it. We then show how the concepts, as we interpret them, can be applied jointly to produce consistent results that are also a meaningful representation of the current economic position of the reporting entity. We shall consider specifically the case of fixed assets, such as property, plant and equipment, although our arguments could be extended to cover other assets and liabilities.

2. Deprival value

As indicated earlier, the objective of deprival value is to assess the value added to a business as a result of owning the asset. This is why value to the business is an equally appropriate and possibly more intuitively appealing description. However, deprival is an alternative characterisation: the answer to 'how much better off am I as a result of owning this asset?' is the same as that to the question "how much worse off would I be if I did not own this asset?[5] This may seem to be a pedantic point, but it answers the commonly made criticism that deprival value is of interest only for insurance purposes.

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[3] IASC (1989), paras 51 and 100(a).

[4] In the past, fair value was typically seen as a feature of the historical cost model and applied, for example, to initial recognition of a delayed payment transaction, or as the basis for allocation of cost between identifiable net assets and goodwill in the context of a business combination accounted for as an acquisition. See, for example, paras 15 and 81 of SFAS 15 (1977) *Accounting by Debtors and Creditors for Troubled Debt Restructurings*, which explain fair value and refer to use of the concept in APB Opinions 16 (1970), 21 (1971), and 29(1973), and APB Statement 4 (1970). The concept was not referred to in the FASB's Concepts Statement 5 *Recognition and Measurement in Financial statements of Business Enterprises* issued in December 1984. However, the FASB has now identified fair value as the appropriate attribute for most measurements at initial recognition and for subsequent fresh start measurements. The FASB 1980 Exposure Draft on specialised assets provides an early example of a proposal to use fair value as a measure of current value.

In answering the above question, however it is put, we have to make appropriate assumptions about the economic opportunities available and which ones are relevant. Since the valuation is being done in relation to the entity that currently owns the asset, these must be the opportunities that are actually available to that specific entity. Thus, if an entity is unable to access a particular market or use the asset in a particular way, these are not relevant opportunities for the assessment of deprival value. However, within the opportunities that are available to the reporting entity, we assess deprival value by assuming that the asset is put to the use that maximises its value. In other words, we assume economic rationality in selecting the economic opportunities upon which the measurement is based, but the set of opportunities from which the selection is made is determined by entity-specific constraints.[6]

Thus, there are two stages in the assessment of deprival value. First, we select the relevant opportunities. Second, we chose between these opportunities.

The selection of the relevant opportunities is based upon the fact that there are three possible courses of action in relation to an asset held by an entity: it can be disposed of, or used in the business, and it can subsequently be replaced by acquisition in the market, if it is used up, disposed of, or otherwise lost. This leads to three types of value: disposal proceeds, present value of future benefits obtainable from use, and replacement cost.[7]

In assessing replacement cost (subsequently abbreviated as RC), we include all of the necessary costs of acquiring the asset: not merely the price, but also transactions, transportation and installation costs. However, economic rationality requires that we assess the minimum replacement cost of the services the entity derives from the asset, that is, the cheapest means of 'making good' the entity if it were deprived of the asset. Thus, if the asset incorporates a redundant technology, we would measure the cost of a cheaper modern equivalent asset as the appropriate replacement cost. Equally, if the existing asset incorporates excess capacity, the replacement cost should be based upon the capacity that is used.

In assessing disposal proceeds, net realisable value (subsequently abbreviated to NRV), we look to the market available to the entity that offers the maximum return for an asset in that particular location and condition. We deduct the necessary costs of selling, transportation and de-installation, so that we assess the net proceeds rather than the disposal price. When disposal is likely to take a significant time, it will be necessary to discount the proceeds to obtain the present value measurement of NRV.

In assessing value in use (subsequently abbreviated to VIU), we assume that the entity owning the asset continues to use it in the most profitable manner that is available to the entity. Thus, the value is entity-specific, insofar as it respects the realistic limitations on present use, but it does not allow for management choice (insofar as management may arbitrarily choose a less profitable use than might be possible). Because use will necessarily take place in the future, VIU is usually a discounted measure, discounting being necessary to reduce the future returns to a present value. The discount rate used should be asset-specific, that is, it should reflect the systematic risks inherent in the use made of the specific asset, rather than the average cost of capital of the entity owning it. However, if the entity were subject to capital rationing, the discount rate would include an additional premium to reflect that situation: it may be economically rational for a capital-rationed entity to dispose of assets (or not replace them) even when their yield would satisfy the market's required rate of return on those assets (because that rate is not accessible to the entity). In assessing the returns from continued use, all future cash inflows and outflows resulting from continued use (including subsequent disposal) will be included. These should be measured by assessing opportunities, that is, the difference in cash flows that results from the continued use of the asset.

Having selected the economically relevant opportunities open to the entity, the deprival value approach uses a simple algorithm to select which one is appropriate. The algorithm uses a concept of recoverable amount (subsequently abbreviated as RA), which is the higher of NRV and VIU, that is, it is the maximum amount realisable by sale or use of the asset. This is compared with RC, which puts an upper ceiling on the deprival because the loss resulting from deprival cannot exceed the cost of making good the loss. Equally, the additional value attributed to owning an asset cannot exceed the cost of buying a similar asset in the market: a firm that owns such an asset can be better off than an otherwise similar firm that does not own the asset only to the extent of the cost (RC) that the second

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[5] This result does rest on the assumption of economic rationality in terms of the entity selecting the combination of projects with maximum added value (for a given level of risk).

[6] Economic rationality is assumed for the purposes of assessing deprival value, but that does not mean that we assume that the entity actually follows the rational course of action.

[7] In order to simplify the exposition and focus on the essential differences between deprival value and fair value, the subsequent discussion assumes certainty, as have most previous discussions of deprival value. If we assume uncertainty, the analysis would have to take account of real options (see footnote 10).

Table 1
Selection of alternative values under different measurement systems

Case	*Relationship*	*'Traditional DV'*	*'Re-stated DV'*
1	NRV>VIU>RC	RC	NRV
2	NRV>RC >VIU	RC	NRV
3	VIU>RC >NRV	RC	RC
4	VIU>NRV>RC	RC	NRV
5	RC >VIU>NRV	VIU	VIU
6	RC >NRV>VIU	NRV	NRV

firm would incur in making itself identical to the first.[8]

The deprival value (DV or value to the business) algorithm is therefore:

DV = min [RA, RC]
where RA = Max [NRV, VIU]

This has an obvious consistency with the traditional valuation rule of selecting cost (in this case RC) or market value (in this case RA, which includes NRV) whichever is the lower.

Table 1 sets out the possible permutations of NRV, VIU and RC (in the second column headed 'Relationship') and the value selected by the deprival value algorithm.[9] This follows the exposition due to Solomons (1966) and Parker and Harcourt (1969). Of the six possible permutations, the first four lead to the selection of RC as deprival value under the conventional interpretation (column 3, headed 'Traditional' DV). This is because, in each of these cases, replacement would be justified if the asset were lost by use or disposal because there exists a use (NRV or VIU) that is greater than the cost of replacement (RC). The fifth case yields VIU as deprival value. This is a situation in which VIU lies between RC and NRV, with NRV being the lower. Thus, the asset is not worth replacing (RC>RA), but continued use is more profitable than sale. It might arise in the case of plant and equipment which has a low NRV because of high costs of sale and de-installation but has a high RC due to high costs of purchase and installation. In such a case, a decline in the profitability of the activity since the original investment could lead to the 'use but do not replace' situation which implies that VIU would be lost if the entity were deprived of the asset. The final case yields NRV as the deprival value. This is a case in which neither replacement nor continued use is economically justified (RC>RA and NRV>VIU), so that immediate disposal is the most valuable course of action, representing the best return available from the asset.

It should be noted that Table 1 merely displays the theoretical possibilities and makes no attempt to rank the cases in order of likelihood of occurrence. Two observations should be made about this. First, Case 3 represents the typical investment in property plant and equipment, if the expectations held at the time of the original investment are fulfilled. In this case, it is profitable to continue to use (RA=VIU>RC) and it is not profitable to sell (RC>NRV). The deprival value is the cost of making good the loss, RC. Second, cases 1, 2 and 4 all assume that NRV>RC: in other words, irrespective of whether the asset can be used profitably in the business of the present owner, it would seem profitable for the entity to sell the asset and replace it, on a continuing basis. These cases all lead, under the deprival value rules, to valuation at RC. This seems to be counter-intuitive and possibly to lead to an under-valuation of the asset under the deprival value system. This is considered further in our re-interpretation of deprival value.

3. A re-interpretation of deprival value

The situation in which NRV>RC, which is assumed in cases 1, 2 and 4 seems, at first sight, to be incompatible with market equilibrium: it would imply that an entity should continuously sell and replace the asset in question. This seems to be implausible in the case of property, plant and equipment held as fixed assets. It seems unlikely that the entity holding such assets would be able to access a selling market which even after transaction costs, yielded a net return greater than the full cost of replacement. Even in the case of trading stocks, we would not expect, under competitive conditions, that the entity could achieve more than a normal rate of return after recovering its selling and replacement costs: for this reason, it is not usual to record stocks at a higher value than their cost, because NRV, including the costs of time and risk as part of realisation costs, should equal RC.

The explanation for the apparent anomaly, in which NRV>RC, must be the fact that NRV relates to the asset actually held, whereas RC is based upon the optimal replacement of the productive capacity utilised by the entity. Thus, if a business occupies land and buildings in an attractive location which is not necessary for its own purposes, RC will reflect the lower optimal replacement cost for use by the present owner, whereas NRV will reflect the higher value realisable in an alternative use and reflected in the market price. Alternatively, in the case of plant and machinery, as well as property, the entity may own excess capacity. In such a case also, RC will be based on necessary capacity, whereas NRV will be based upon the actual capacity owned which might attract a higher value. When, as result of such a situation, NRV>RC, we can describe the difference (NRV-RC) as the value of a redevelopment or redeployment opportunity. The process of redevelopment or redeployment through the market (measured by NRV) would involve what advocates of fair value would describe as an assumption of 'highest and best use' of the asset, as reflected in its market price.

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[8] Of course, this does not mean that VIU cannot exceed RC. It would be expected that VIU>RC for intra-marginal investments, but the ability to achieve a return in excess of that required to justify replacement can be attributed to the goodwill (or possibly another asset) of the owning entity.

[9] Discussion of the entries in the 'Re-stated DV' column is deferred until Section 3 below.

In these cases, in which NRV>RC, setting deprival value to RC provides a current valuation of the services currently used by the business but ignores the potential benefits obtainable by exercising the redevelopment or redeployment opportunity, captured by the higher NRV. The value of such opportunities (NRV-RC) could be reported separately for each class of assets, but it would be simpler and less costly to include them in the DV of the assets to which they related.[10] This would lead to the 'Restated DV' measure shown in the fourth column of Table 1. It can reasonably be argued that this is a more appropriate measure of the consequences of deprival. If an asset had NRV>RC, then the entity, if deprived of the asset, would not be fully compensated by being awarded RC: it would also require compensation for the redevelopment or redeployment opportunity.[11] It should be noted that these are market opportunities actually available to the entity and measured in NRV.[12] They do not include the cost of excess capacity which could not be recouped, either because others had no use for it (that is, there was only a scrap market) or because the costs of de-installation and sale reduced NRV to RC or lower.

The effect of this re-statement of DV is to bring it much closer to the concept of fair value (FV), because the re-statement, like FV, is based upon valuing the assets in terms of the prices at which they would exchange between willing buyers and willing sellers in the market place. Clearly, a market transaction would be influenced by the possible benefits of redevelopment or redeployment.

4. Fair value

If fair value is estimated by market price obtained from an active, well-informed and competitive market it will provide an objective measure which is free from subjective intentions and beliefs of the current owner of the asset. This will reflect the 'highest and best use' available to market participants, that is, the return available by the marginal purchaser in the market place. It should be noted that this is not the best return available to any owner of the asset because the returns to intra-marginal purchasers or present owners will include producer or consumer surplus.

The IASB definition of fair value, quoted earlier, is similar to the definitions given by the FASB in Concepts Statement 7 and in the 2004 Exposure Draft:[13]

> 'The amount for which that asset (or liability) could be bought (or incurred) or sold (or settled) in a current transaction between willing parties, that is, other than in a forced or liquidation sale.' (Concepts Statement 7, FASB, 2000)

> 'The price at which an asset or liability could be exchanged in a current transaction between knowledgeable, unrelated parties.' (Exposure Draft, FASB, 2004)

The only significant difference between these definitions and the IASB definition is the reference to the transaction being between knowledgeable parties, thus implying the absence of information asymmetry.[14] However, Foster and Upton (2001b), in their clarification of the FASB interpretation of fair value, state that it assumes that there are 'no significant information asymmetries'. Thus, we can assume that the objective of both definitions is identical, and the interpretation of fair value given here is based on that of Foster and Upton.

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[10] Strictly, if we drop the assumption of certainty and take an option pricing perspective, the value of the option to realise this opportunity is not (NRV-RC): that is merely the gain to be had by exercising the option immediately (its intrinsic value). More generally, if we assume (realistically) that there is uncertainty and irreversibility in the investment process, we have to introduce the value of real options into the deprival value analysis (Stark, 1997).

[11] Indeed, it could be argued that the Traditional DV actually measures the loss from deprival only if RC refers to the capacity of the asset valued by the market and not just the capacity utilised by the entity. However, that would still leave cases 1, 2 and 4 as being plausible for property, plant and equipment assets in temporary market disequilibria.

[12] The reasons why such opportunities might arise are varied. For example, in the case of land the land on which the business premises are located might have increased dramatically in value because of favourable demographic changes in the locality. The opportunity would be non separable from the asset and therefore exercise of the opportunity to redeploy would require sale of the asset and (presumably) replacement of it by another asset (at the amount RC) which could provide the services currently used by the business.

[13] At the time of revising this paper (February 2006), the FASB and the IASB are both considering amendments to this definition which, if adopted, will define fair value more clearly as a market selling price.

[14] In normal recording of transactions it is implicitly assumed that the parties are unrelated and therefore the reference to this aspect in the Exposure Draft definition would not seem to be significant.

Fair value is thus based on the concept of exchange value between willing parties in a well-informed open market. It measures the consideration exchanged and therefore does not consider transactions costs. Furthermore, it does not address the question of which market to choose where more than one is accessible (e.g. a wholesale market and a retail market).

The fair value objective assumes that there is, or might be, a single price at which the asset should be exchanged. In order to identify that price, a measurement hierarchy is used. This consists, first, of seeking a quoted price in an active market. If such a price is unavailable, prices of similar assets should be sought. If these are unavailable, valuation techniques should be used to infer the price at which the asset would exchange if an active market were available. The most common of these for property, plant and equipment will be the calculation of a present value by discounting the cash flows obtainable from future use. If this is done, the cash flows and the discount rate should be based on notional market based assumptions, not the 'entity specific' assumptions that would be used by the present owners. The latter might include the effects of specific advantages available to the present owners which would not be reflected in the market price. The market assumptions should exclude such excess returns (which are, in effect, separate intangible assets due to management skills, special knowledge or other specific advantages over other participants in the market), and should be based on the "highest and best use" accessible to the market, that is, the assumptions that would apply to the marginal purchaser.

The notional market based assumptions should reflect the information that would be expected to be used by market participants and obviously should not contradict any information known to be used by market participants. Foster and Upton (2001b) suggest the following assumptions about how the notional market would work:

- the buyer has use for the asset in its current state;
- the buyer will put the asset to its highest and best use;
- the buyer can obtain reasonable information about the asset's condition and uncertainties in use (there are no significant information asymmetries);
- the buyer is interested in the specific asset in question; and
- the buyer and seller will transact in the market that is most advantageous to them (especially important in terms of assets trading both in sets and individually).

This approach clearly shows that where there is no market, as would be the case for highly specialised assets, fair value does not necessarily reflect the selling price for scrap purposes as it is assumed that the buyer of an asset has a use for it in its current state. In such circumstances, fair value is therefore not an actual price but rather a notional market price – the price that would be expected to apply if there were a market operating under the specifications stated above. Thus an actual selling price for scrap purposes could be significantly less than fair value even when there was no actual sale at fair value.

5. An extension of fair value

Fair value, as described above, is an attractive method of measurement, combining up-to-date valuation with the objectivity of relying on market value and assumptions, rather than the subjective estimates of management. Two problems that FV does not address are transactions costs and the choice of market. Here we propose extensions of the FV concept to deal with them.

Transactions costs can be significant, particularly for items of property, plant and equipment, which may involve high costs of conversion, installation and transportation, as well as high dealing costs (relative to those of financial instruments) due to the specific nature of the asset.[15] Thus, if fair value is based upon buying price, the value (as opposed to the price) must include acquisition costs if it is to reflect the full economic burden of buying. Equally, if fair value is based on selling price, we must deduct selling costs if we are to reflect the economic benefit obtainable by selling. It is these burdens and benefits that reflect the economic opportunities offered by the market place. The price (as opposed to the value after adjustment for transaction costs) is often essentially arbitrary, depending upon the extent to which transactions costs such as dealing commissions or delivery charges are bundled into it. In some cases, dealers will quote two prices, a bid price and an offer price, the difference between them being the dealer's return from dealing, which could equally well be described as a commission. In such cases, the transaction cost is inevitably included in the price.

Thus, an economically meaningful measure of value as either outlay on acquisition or proceeds of disposal must include the effects of transactions costs. If we wish to define FV as a price, rather than a value in exchange, we may find that some transactions costs are included in the price and others are excluded. Consistent economic measurement requires that we add in all acquisition costs when FV is based on an entry (acquisition) value and deduct all disposal costs when it is based on an exit (disposal) value. It does not matter whether we describe such measures as FV or as 'FV plus acquisition costs' and 'FV less disposal costs' so long as we have a clear objective of measuring the asset at an amount that reflects the relevant transaction costs.

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[15] We treat installation and dismantlement costs as part of the transactions costs because they are essential costs of acquisition or disposal of property, plant and equipment assets.

This brings us to the important question of choice of market, and, in particular, whether that should be the market for acquisition (entry) or disposal (exit). Once we have resolved the entry/exit problem, the appropriate method of dealing with transactions costs is decided (add to entry price and deduct from exit price), and the choice between different markets is straightforward, being determined by the assumption that a profit-maximising entity will choose the market that offers the lowest total acquisition cost or the highest net disposal proceeds.

The hierarchy of fair value measurement described earlier, does not resolve the 'which market?' problem. Rather, it deals with the more practical question of finding information of suitable reliability. We need, additionally, guidance on which price to use when reliable prices are available for both acquisition and disposal and these prices differ. A possible source of guidance here is the concept of the highest and best use. One interpretation of this might be to regard net selling price (NRV) as that reflecting the highest and best use obtainable through the market for an asset owned by the entity. This would be consistent with the interpretation of fair value for financial instruments as a bid price (selling price), adopted by the Financial Instruments Joint Working Group of Standard Setters (2000). However, for property, plant and equipment assets, which might be highly specific as to design and location and have high relocation costs, the present use might be the highest and best use and NRV might be very low. In the extreme, NRV night be a scrap value, which is inconsistent with the definition of fair value, as interpreted by Foster and Upton (2001 a and b).

This situation arises in cases 3 and 5 of Table 1. In both cases, NRV is lower than both VIU and RC. In case 3, VIU is the highest value and RC is the next highest. We earlier characterised this as the case of the typical property, plant and equipment asset which is profitably used by the business, would justify replacement, and would attract a relatively low value on disposal. In such a case, it might be acceptable to measure FV as RC, which is the higher of the two observable market values, on the ground that the market transaction that an economically rational entity would conduct in relation to this asset would be to replace it when its present use expired. It would be replaced by the most efficient means, so that the 'modern equivalent asset' approach to measuring RC, used earlier in the measurement of DV, is still appropriate. The higher VIU is inappropriate as a measure of FV because it exceeds both market valuations (RC and NRV), so there is no evidence that it represents a 'highest and best use' obtainable through the market, rather than some entity-specific advantage enjoyed by the current owner.

In case 5, NRV is again lower than both VIU and RC, but RC is now greater than VIU, so that the entity's economically rational course of action is to continue to use the asset (VIU>NRV) but not to replace it when it has been used up (RC>VIU). In this case, NRV is not the highest and best use: continuing use yields a higher value. RC may be an indication of the highest and best use available in the market, if there are currently transactions to buy at that price. However, it is difficult to argue that RC represents the highest and best use of the asset currently held, because that can be placed in the market only at the lower NRV. Thus, VIU may be taken, in this instance, as fair value.[16] Admittedly, VIU will be (as was the case of deprival value) estimated by current management, using entity-specific assumptions, but advocates of fair value do concede that this may be necessary when there is no alternative evidence available from the market place. In the present case, VIU is bounded above by RC (and below by NRV), so that the scope for the entity's own assumptions to give rise to a misleading higher value (eg due to the effects of adding in otherwise unrecognised intangible assets) is constrained.

6. A reconciliation

Given the above re-interpretations of DV and FV, it can be seen that fair value leads to identical results to those ascribed in Table 1 to Re-stated DV. Case 3 leads to RC, case 5 to VIU and the other cases all lead to NRV.

The changes to the conventional interpretations of DV and FV that were necessary to achieve this reconciliation were as follows:

- In the case of DV, it was assumed that any instance of NRV>RC implied a redevelopment or redeployment opportunity, which should make NRV a more appropriate value of the asset than RC .

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[16] A number of approaches have been suggested for avoiding DV being measured by VIU. Stamp (1971) suggested that RA should be estimated only as NRV, which would then be DV in case 5. Gee and Peasnell (1976) suggested that RC would be the best estimate of VIU in case 5. Baxter (1994) argues that case 5 is unlikely to arise. Baxter's view is that when an asset reaches the phase in its life where RC apparently exceeds VIU, this probably reflects an over-estimation of RC (possibly due to basing RC on an arbitrary calculation of depreciated replacement cost rather than an assessment of what the asset's services are currently worth to a rational purchaser in the second-hand market).

- In the case of FV, it was assumed that transactions costs should be allowed for in assessing acquisition and disposal values.
- In the case of FV, it was assumed that NRV represents the 'highest and best use' of an asset already held, except when it is exceeded by both RC and VIU. In the latter cases, 'highest and best use' is inferred by assuming profit-maximising behaviour.

The fact that DV and FV can be reconciled in this way should not be surprising.[17] They both seek current valuations and they are both based on the assumption of economic rationality: DV through the idea of profit-maximisation and FV through the concept of 'highest and best use'. Entrenched advocates of either DV or FV may object to the three changes made to the concepts, but they seem to be consistent with the objective of measuring the current value of the asset in terms of the economic opportunities that are available to its current owner in the condition and location in which it is currently to be found. This is asset-specific valuation, but it avoids the use of entity-specific assumptions except when they cannot be avoided. This is the stance usually adopted by advocates of fair value and is consistent with the proper application of deprival value thinking.

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[17] The result that current value is either RC or NRV has strong similarity to the 'essential to continuance of operations' approach to valuation proposed in the AARF 1975 Preliminary Exposure Draft *A Method of Current Value Accounting.*

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Book Review

The role of performance measurement systems within global organisations. *Cristiano Busco, Mark Frigo, Elena Giovannoni, Angelo Riccaboni* and *Robert Scapens*. London: ICAEW, 2006. x + 61pp. £20. ISBN 184 152 4077.

The objectives of this report are broad and ambitious: an exploration of the use of performance management systems (PMS) to manage organisational integration at global level, the ways in which PMS are used to create 'a common organisational language of measurement' and embed this in organisational culture, the role of PMS in the governance of heterogeneous organisational resources, and the capabilities required of finance experts in using PMS in these ways. Each of these topics would have offered scope for a full project and the report will have fulfilled an important purpose if it prompts further investigation in these areas.

The five authors achieve the first objective in a structured and interesting way, based on research in four companies: General Electric, Nestlé, Shell and Whirlpool. They provide a clear outline of the evolution of strategic approaches by global organisations, their integration needs and the mechanisms developed to meet those needs. Vertical and lateral relationships, formal and informal control mechanisms and the links made between global and local practice through corporate culture are all discussed in the context of the PMS used in the case study companies.

However, the other objectives are less successfully addressed. There is very little discussion of the development of common measurement languages in the case companies, particularly the challenge of ensuring common understanding of global metrics. The PMS descriptions are silent on any difficulties encountered in their introduction. The acquisition of Nuovo Pignone by GE and its integration through cultural change is particularly interesting since it describes a fairly unusual success story of a local culture being complemented rather than overwhelmed by the integration of a global culture. The authors observe: 'Yet, this is not a story of blood spilled or brute force used, and '...coercion and seduction played equally important roles.' (p52) But there is no indication of whether the story is being told by the coerced, the seduced or an impartial observer. The skills required of the finance function in relation to PMS are also dealt with briefly, with little reference to the research data.

The main focus of the report is the authors' argument that PMS offer an integrated approach to governance. This is demonstrated by the development of a model which links compliance, performance and knowledge in an 'integrated governance' framework, each area supported by PMS mechanisms. The model is then used as a basis for the design of a monitoring tool, an 'integrated governance scorecard'.

This reader would have appreciated more insight into the thinking behind the model. The authors state that 'we need to extend the meaning of good governance by linking compliance to systems of performance measurements' (p2). The basis for this assertion is not made clear: there is no indication that the governance model is derived either from the research data or from other studies, although it is closely linked to the notion of 'enterprise governance' promoted by CIMA and IFAC (CIMA/IFAC, 2004).

Enterprise governance comprises corporate governance, defined as conformance, and business governance, related to performance. Its proponents advance it as a means of balancing governance demands, implying that conformance aspects have dominated governance developments to the detriment of performance aspects. This view was expressed by early critics of the developing UK governance system and in the report of the Hampel Committee but empirical evidence supporting this argument is sparse (Spira, 2001). However, the board's inward-facing responsibility for the formulation and monitoring of enterprise strategy has not been neglected in governance models – see, for example, Tricker's early analysis of the twin conformance and performance roles of the board (Tricker, 1994:287).

The concept of corporate governance has been defined in many ways since it became a major concern worldwide after the financial scandals of the 1980s, but most definitions, be they broad or narrow, distinguish between governance and management. Governance is the purview of the board of directors. This is an important distinction which reinforces the process of organisational accountability. The authors assert that: 'The governance system can no longer be regarded as something that happens at the top of the organisation. It has to be deeply embedded in day-to-day operations and activities...' (p30). But if governance becomes a concern at every organisational level, responsibility is potentially diffused.

To support their conformance role, boards receive assurance on the compliance aspects of corporate governance from the existence of sound internal accounting systems and controls. To support their performance role, they rely on sound systems of strategic implementation and performance measurement. Certainly such systems have a vital role in operational integration, as demonstrated by the case companies, but their role in governance seems less clear-cut than the authors suggest. It is notable that the discussion of the PMS mechanisms in relation to the compliance section of the model is limited, perhaps because the link is more obscure.

This report provides sound evidence relating to the role of PMS in the integration of global organisations. The authors are less successful in demonstrating the link between PMS and governance responsibilities and it is therefore difficult to see the advantages of the Integrated Governance Scorecard over other similar tools.

Oxford Brookes University Laura F. Spira

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Guide for Authors

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Accounting and Business Research

The distribution of earnings relative to targets in the European Union

An empirical assessment of the Feltham-Ohlson models considering the sign of abnormal earnings

The ABI guidelines for share-based incentive schemes: setting the hurdle too high?

The determinants of the UK Big Firm premium

The survival of international differences under IFRS: towards a research agenda

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Accounting and Business Research

Volume 36 Number 3 2006

Contents

Obituary: Professor William Threipland Baxter 135

Articles

The distribution of earnings relative to targets in the European Union	Holger Daske Günther Gebhardt Stuart McLeay	137
An empirical assessment of the Feltham-Ohlson models considering the sign of abnormal earnings	Begoña Giner Raul Iñiguez	169
The ABI guidelines for share-based incentive schemes: setting the hurdle too high?	Brian G. M. Main	191
The determinants of the UK Big Firm premium	K. P. McMeeking K. V. Peasnell P. F. Pope	207
The survival of international differences under IFRS: towards a research agenda	Christopher Nobes	233

Notices 247

Forthcoming Articles

Lynn Hodgkinson, Kevin Holland and Richard H. G. Jackson, Dividend valuation, trading and transactions costs: the 1997 partial abolition of dividend tax credit repayments

Neil Robson, The road to uniformity: Accounting change in UK voluntary hospitals

John R. Hillier and Roger J. Willett, The impact of depreciation-type adjustments on the distribution of accounting earnings

Charlie Weir and Mike Wright, Governance and takeovers: are public-to-private transactions different from traditional acquisitions of listed corporations?

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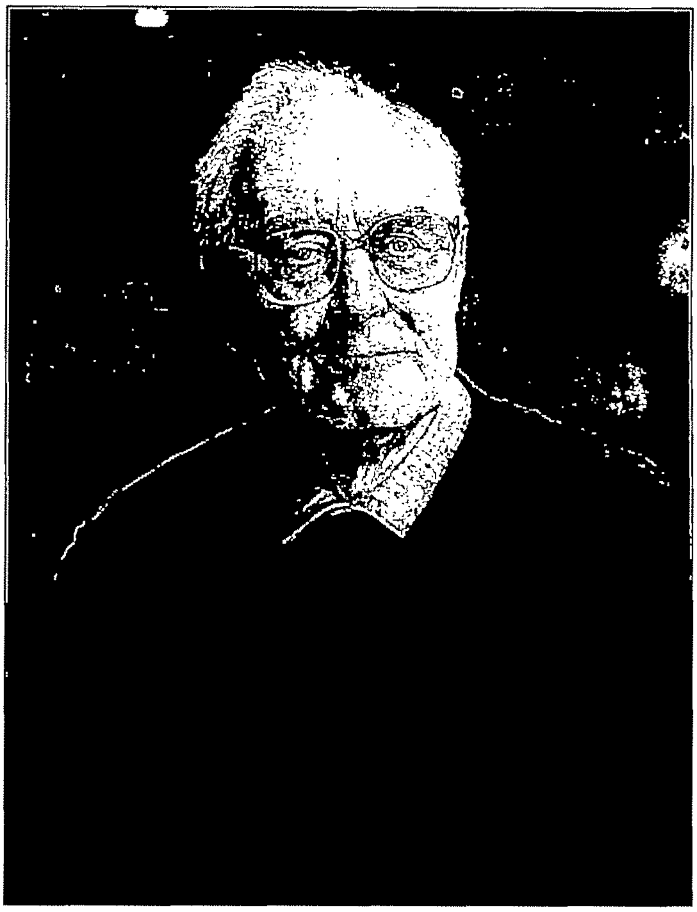
Accounting and Business Research, Vol. 36. No. 3. p. 135-136. 2006

Obituary
Professor William Threipland Baxter

Born 27 July 1906 in Grimsby
Died 8 June 2006 in London



Professor William Baxter made an outstanding contribution to the development of accounting as an academic discipline, both in teaching and in research. His contribution to research developed during the period as professor of accounting at the London School of Economics (LSE) from 1947 to 1973, but he continued to be active in publication of his research thinking for the rest of his life.

Driven by a strong interest in concepts of value, developed in debate with leading economists of the time, he made many contributions on the subject of inflation accounting, on the nature of depreciation and on the role of opportunity cost. This work provided a substantial contribution to ideas on the introduction of financial reporting measurements consistent with the economic theory of decision making. He developed this line of thought on the basis of 'deprival value' (also known as 'value to the business') which he had encountered in the work of Bonbright. His writings on the theory and practice of depreciation brought together discounting techniques and deprival value.

His early years were spent in Edinburgh, where he combined studies for the BCom degree of Edinburgh University with an apprenticeship to the chartered accountancy firm of Scott Moncrieff, Thomson and Shiells. After qualifying in 1930 as a member of the Institute of Chartered Accountants of Scotland, he joined the Edinburgh firm of Graham, Smart and Annan. One of the partners, William Annan, also occupied a part-time chair in accounting at the University of Edinburgh. Annan introduced Baxter to university lecturing and also encouraged him in obtaining a Commonwealth Fund Scholarship to study for two years in the United States at the Universities of Pennsylvania and Harvard.

On returning to Edinburgh he lectured at the university, but also took time to continue his interest in researching business history and to establish contacts at the LSE. In 1937 Baxter was offered a Chair of Accounting at the University of Capetown, remaining there until 1947 when he returned to Britain to become the first full-time Professor of Accounting at the LSE. Beyond his considerable influence on the development of accounting education within LSE, Professor Baxter was a co-founder of the Association of University Teachers of Accounting (AUTA), later to become the British Accounting Association (BAA), and edited the AUTA Newsletter which developed into the *British Accounting Review*. With Professor Sidney Davidson of the University of Chicago he founded the *Journal of Accounting Research* in 1963. He was honoured with a Lifetime Achievement Award of the BAA (2004) and induction into the American Accounting Hall of Fame (2005).

Professor Baxter's contribution to the accounting discipline was celebrated at the LSE in a symposium held on 15 July 2006, where his immediate family was joined by his wider circle of colleagues, former students and friends. A collection of reminiscences was presented to Mrs Leena Baxter. Speakers provided a review of his role in the history of accounting at the LSE and an evaluation of the continuing significance of his work. Professor Sidney Davidson sent a video message, reminding the audience of the fruitful collaboration between Baxter and Davidson and underscoring the enduring friendship engendered in such work.

In 2005 the Institute of Chartered Accountants of Scotland published an interview with Professor Baxter. The interview transcript, accompanied by a biographical note from Professor Geoffrey Whittington and a list of Professor Baxter's publications, provides a useful starting point for those not already familiar with Professor Baxter's work and an indication of the fruits of a long life, lived to the full.

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Accounting and Business Research, Vol. 36. No. 3. pp. 137-167. 2006

The distribution of earnings relative to targets in the European Union

Holger Daske, Günther Gebhardt and Stuart McLeay*

Abstract—This paper provides evidence on the distribution of reported earnings relative to targets in the Member States of the European Union (EU). For a large sample of over 60,000 firm-years between 1986 and 2001, we find that more firms than expected (i) report small positive earnings, (ii) report small positive earnings changes and (iii) have zero or small positive forecast errors. These discontinuities are much more pronounced in the EU compared to the US, and the distributions of reported earnings and earnings changes are characterised by lower dispersion and more clustering around zero, consistent with higher income smoothing in Europe. Across the EU, we find that the avoidance of a loss or an earnings decrease is more common in those Member States which do not have a long history of accounting standard setting, and particularly in those which, until recently, were almost entirely law-based. The earnings distributions and earnings change distributions of UK firms resemble more those of their counterparts in the US, and differ from the rest of the EU, despite the various EU harmonisation efforts that have taken place.

1. Introduction

Empirical research in the US and in the UK has provided substantial evidence about systematic patterns in the distribution of earnings relative to specific targets, consistent with the view that managers seek to avoid reporting losses, to increase earnings relative to the last fiscal year and to meet or beat consensus analyst earnings forecasts (Burgstahler and Dichev, 1997; Degeorge et al., 1999; Peasnell et al., 2001).

The present study extends the existing evidence by investigating such 'benchmark beating' behaviour in the European Union. The EU is particularly interesting as it is large enough as a whole to allow a direct comparison with the results of existing US studies. Yet, despite its common political, economic and regulatory base, there is sufficient diversity in accounting regulations and institutional settings across the Member States of the EU to permit the study of such differences which have persisted regardless of accounting harmonisation.

For a large sample of over 60,000 firm-year observations for the fiscal years 1986 to 2001, we find that more EU firms than expected (i) report small positive earnings, (ii) report small positive earnings changes and (iii) have zero or small positive forecast errors. These discontinuities around zero in the earnings and earnings changes distributions are shown to be far more pronounced in our EU sample compared to prior US evidence. In addition, the distributions of earnings and earnings changes are less spread and more clustered around zero. Across the EU Member States, we find that behaviour that leads to the avoidance of a loss or of a decrease in earnings varies considerably. Such benchmark beating is more common in Continental Europe, particularly in those Member States of the EU where the regulation of accounting has been almost entirely law-based in the past (Austria, Germany and Italy). The distribution of earnings in the UK, on the other hand, resembles more the distribution of earnings in the US rather than the rest of the EU. An analysis of EU firms which have already adopted some form of 'internationally recognised' accounting standards shows that benchmark beating remains present even under the new reporting standards.

This paper further contributes to the discussion on what determines earnings and earnings change discontinuities and whether they are associated with earnings management (e.g. Beaver et al., 2003a). Previous authors have analysed the (short-term) use of aggregate or specific discretionary accruals around targets in order to meet certain earnings benchmarks (e.g. Dechow et al., 2003). Instead, we investigate the relationship between the (long-term) smoothing of income and the level of benchmark beating. We argue that firms which

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*The first two authors are at Johann Wolfgang Goethe-Universität Frankfurt am Main, Germany; author three is at the University of Wales, Bangor. The paper forms part of the HARMONIA program on research into accounting harmonisation and standardisation in the EU. The authors gratefully acknowledge the financial contribution of the European Commission through the Human Potential Program, Contract HPRN-CT-2000-00062 and of Arthur Andersen and Ernst & Young. They are also grateful to Thomson Financial *I/B/E/S* for providing analyst earnings forecast data as part of a broad academic program to encourage earnings expectations research. Correspondence should be addressed to: Dr Holger Daske, Professur für Betriebswirtschaftslehre, insb. Wirtschaftsprüfung, J.W. Goethe-Universität Frankfurt am Main, Mertonstr. 17–25, D-60325 Frankfurt am Main. E-mail: daske@wiwi.uni-frankfurt.de.

The final version of this paper was accepted in April 2006.

smooth income over time should be able to increase their flexibility to react in periods in which pre-managed earnings fall below a specific target. Such firms should then have, *ceteris paribus*, a higher probability of reporting earnings above the target after exercising their accounting choice. We measure income smoothing by using three largely independent proxies, based on (i) the distributional properties of earnings and earnings changes, (ii) the variability of earnings relative to sales and (iii) the correlation between accruals and cash flows from operations. As with benchmark beating, we find systematic differences in income smoothing behaviour within the EU. The results show that firms incorporated in Germany engage in income smoothing to the greatest extent, while firms that are domiciled in the UK exhibit among the lowest levels of income smoothing. When we combine our two approaches and test for the relation between benchmark beating and income smoothing at the country level, we find that income smoothing is significantly related to reporting positive earnings, but we do not find a statistically significant relation to reporting an earnings increase nor to achieving the consensus forecast produced by analysts.

The results of this study are important because they illustrate how diverse the distributional properties of earnings have been under local GAAP in the EU – despite the various efforts to harmonise accounting. The persistence of systematic differences amongst the Member States of the EU has been documented previously. However, the results reported in this paper reveal the considerable magnitude of the remaining differences. The graphical comparisons of earnings and earnings changes that are provided in the paper illustrate this result to both specialists and non-specialists.

The remainder of the paper is organised as follows: Section 2 reviews related research studies; Section 3 describes the sample and test methodologies; Section 4 summarises the results and the conclusions are set out in Section 5.

2. Earnings targets, managerial discretion and financial reporting in the EU

2.1. Earnings targets in the EU under national accounting rules

Accounting standards grant flexibility to firms in reporting their financial performance. Incentives for managers to exploit such discretion can stem from various contractual and valuation-based motivations (see e.g. Dechow and Skinner, 2000). Such incentives can be expected to exist around specific earnings thresholds. Survey evidence suggests that managers are particularly concerned about meeting or beating several such accounting based benchmarks (Graham et al., 2005). Indeed, managers often highlight in the annual report and at press conferences the simple fact that the firm has recorded a profit, and also the fact that the current result is better than last year's. News reports in the media often comment on whether a firm has earned a profit or loss, or whether it has increased or decreased its earnings relative to the previous period and also increasingly whether or not it has met or beaten analysts' expectations. Thus, it can be considered commonplace in the financial community for preparers and users alike to reference a firm's reported performance against simple earnings thresholds.[1]

Accordingly, the incentive to meet earnings targets may arise from capital market expectations. In fact, research in the US has documented not only that a failure to meet or beat consensus analysts' earnings forecasts results in a decline in the reporting firm's stock price (Kinney et al., 2002; Bartov et al., 2002), but also that the US equity market assigns a valuation premium to firms with a positively growing earnings trend (Barth et al., 1999). Firms that break their pattern of increasing earnings suffer instead from abnormal negative stock returns (DeAngelo et al., 1996). It is also the case that targets based on financial statement information play an important role in contracting. It is common, in fact, to find covenants based on accounting ratios in public or private debt contracts (e.g. Dichev and Skinner, 2002). Moreover, managerial compensation packages that affect financial statement preparers directly are often linked to accounting-based performance measures and certain profit targets (e.g. Matsunaga and Park, 2001).

Prior research has provided compelling empirical evidence about the importance of earnings targets, drawing on large samples mostly in the US (Hayn, 1995; Burgstahler and Dichev, 1997; Degeorge et al., 1999). Systematic patterns in empirical earnings-based distributions show unexpectedly high frequencies of observations above the earnings targets and unexpectedly low frequencies of observations below the earnings target. This literature has focused on three earnings targets, namely (1) reporting profits, or 'positive earnings', (2) reporting results that improve upon last year's performance, or 'positive earnings change', and (3) meeting or beating consensus analysts' earnings forecasts, or 'positive earnings surprise'.

Other evidence on benchmark beating is available for the UK (Peasnell et al., 2000, 2001) and Australia (Holland and Ramsay 2003). In a comparative international context, Leuz et al. (2003)

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[1] Transaction cost theory and prospect theory have been offered as potential explanations for why market participants and institutions seem to rely on simple earnings benchmarks (see Burgstahler and Dichev, 1997:121–124 and Degeorge et al., 1999:5–15).

utilise the ratio of small positive to small negative earnings as one of their proxies for earnings management across 31 countries around the world. Their focus, however, is more on detecting institutional factors that explain earnings management than on a closer comparative examination of the benchmark beating phenomenon. Brown and Higgins (2001) analyse earnings surprises for 12 countries outside the US, but cover only the largest seven EU Member States.

International evidence is important not only because it can add to the general understanding of the benchmark beating phenomenon, but also as it documents the occurrence of the phenomenon under alternative accounting regimes and institutional settings. The European Union seems particularly suitable for such an international analysis. On the one hand, the EU is large enough to draw comparisons with prior US evidence as sample sizes are similar. At the same time, as accounting harmonisation has placed far greater emphasis until recently on a common obligation towards accountability rather than the direct comparability of financial statements, the different accounting traditions in Europe continue to show strong persistence of their national traits. In this respect, the comparative accounting literature (e.g. Nobes and Parker, 2006) has broadly distinguished between the so-called 'British' model based on US-style standard-setting (i.e. in the UK, Ireland and the Netherlands) and the alternative 'Continental European' model, with the latter further separated into regimes that have their origins either in the French approach to planned uniformity (Belgium, France, Greece, Portugal and Spain) or in the German approach to detailed regulation under the law (Austria, Germany and Italy), together with a mixed Scandinavian model where earlier attempts at regional harmonisation add to the cohesion within this grouping (Denmark, Finland and Sweden). With regard to the Member States themselves, the UK and Germany are usually presented as the *de facto* opposing boundaries of financial reporting in the EU (e.g. Joos and Lang, 1994).

Often, these groupings based upon accounting origins and traditions are also deemed to share similar institutional features, which affect reporting incentives and constraints. Such institutional factors that remain particularly heterogeneous across the EU Member States include legal systems that apply law in different forms (such as statutory instruments or ministerial orders, which are codified in some jurisdictions and not in others), enforcement agencies that represent public or private interests, a linkage of tax accounting and financial accounting, ownership structures that range from widely held share holdings to block holdings, as well as the relative importance of equity trading and the differing traditions that appear to persist in the financial sector with regard to corporate debt financing. Other studies have exploited this unique EU setting in comparative accounting research for similar reasons (e.g. Burgstahler et al., 2006).

The extent of benchmark beating across the EU Member States will depend on both the relative incentives to achieve the various earnings benchmarks as well as the opportunities and constraints surrounding accounting choice and reporting flexibility under the accounting regimes in place. The way in which corporate ownership is structured and the nature of information asymmetries between contracting parties will each affect the firm's reporting incentives. In outsider systems such as the US, the UK and the Netherlands, wider ownership is more likely and thus investors will have restricted access to privileged information. In these circumstances, high quality reported information is crucial for investors in order to monitor firms. In contrast, corporate governance in insider systems is characterised by privileged access to new information in view of the concentration of ownership and greater reliance on relationship banking, with information asymmetries being resolved more readily by private information channels rather than by public disclosure. This reduces the demand for public information relative to the outsider system (Ball et al., 2000) and increases the scope for earnings management, which has been shown to be more acute in insider financial systems (Leuz et al., 2003). Accordingly, to the extent that the discontinuities in earnings levels, changes and surprises capture earnings management, we expect such activities to be higher in France, Germany and similar jurisdictions which tend towards the 'insider' system than in the UK, the Netherlands and Ireland which have more of the characteristics of the 'outsider' system, with the Scandinavian countries somewhere in the middle.

2.2. *Earnings targets, managerial discretion and income smoothing*

Following the suggestion by Hayn (1995:132) that the discontinuity in the distribution of earnings is associated with the discretionary manipulation of earnings through creative accounting, the ratio of small profits to small losses has been established as a standard approach to test for earnings management (e.g. Healy and Wahlen, 1999:379). It has been pointed out in a number of subsequent studies, however, that discontinuities alone are not sufficient to prove earnings management and, as a result, the exercise of discretionary accruals has been investigated (Dechow et al., 2003). These studies either utilise discretionary accruals models that try to capture the full effect of accruals management or, alternatively, analyse specific types of accruals that are expected to be particularly suited to earnings management.[2] While the former generally are unable to confirm an increase in discretionary accruals around targets, the latter commonly conclude that the asymmetric pattern of accruals is in fact attributable to earnings management. In addition, alternative interpretations have been offered based on non-discretionary earnings components (Beaver et al., 2003a) or on the statistical properties of scaled variables (Durtschi and Easton, 2005).

We would argue that such approaches to the detection of earnings management around targets may not be implemented readily in this multi-country study. First, the power and accuracy of discretionary accruals models have not been tested for European accounting regimes except for the UK (see Young, 1999). Second, the strict application of a discretionary accruals model in the smaller EU Member States is not possible due to data limitations, and would have little merit as model performance has been modest even with large samples (e.g. McNichols, 2000). Therefore, we focus instead on two alternative indicators: the distribution of cash flows from operations, and the smoothing of income.

Cash flows from operations are attributable to the financial transactions that arise from the economic activities of firms, and are generally not subject to managerial accounting discretion. Whilst a cash flow analysis allows us to test therefore whether or not observed discontinuities in earnings are related to economic performance or are due to the accruals process, it does not allow us to distinguish between the nondiscretionary and discretionary components of accruals. The analysis of income smoothing could provide a suitable means of detecting managerial discretion in this respect. Income smoothing is a device through which managers 'save' accrued earnings for future reporting periods by means of discretionary accounting choices that are exercised when the performance for a given period is particularly good. A firm that falls slightly below the target level in pre-managed earnings in a subsequent period can use such 'saved' accruals to achieve its earnings target, again by exercising a discretionary accounting choice. *Ceteris paribus*, smoothing firms should have a higher probability of achieving earnings targets than other firms which prefer to show the best results possible in a given reporting period and therefore have no upside accruals potential left from prior periods. This reasoning is similar to that of Beaver et al. (2003b) who use the distribution of earnings not only for an analysis around the target area, but also exploit information in the upper and lower tails of the distribution in order to analyse income smoothing. More specifically, they show that loss reserve accruals in the insurance industry are used not only to report profits, but also to smooth income. To the extent that the discontinuities are really caused by earnings management, we would expect to find a positive relationship between the level of smoothing and the level of benchmark beating across the Member States of the EU.

2.3. Earnings targets in the EU under IAS/IFRS or US-GAAP

Given the unsuccessful attempts to further improve on the basic reporting requirements set forth in the Fourth and Seventh Directives and the failure of the EU strategy of securing from the US the mutual recognition of locally promulgated financial reporting standards, the European Commission implemented a new strategy in 1995 that acknowledges and supports the standards issued by the International Accounting Standards Committee (EU COM (95) 508 1995). This policy finally led, in July 2002, to Regulation (EC) No. 1606/2002 that requires all publicly traded companies in the European Union to adopt the International Financial Reporting Standards (IFRS) issued by the renamed International Accounting Standards Board from 2005 onwards.

The process leading towards the adoption of internationally recognised standards, however, started well before the EU Regulations were issued and was initiated by multinational corporations that wished to attract foreign capital or to widen their shareholder base through international equity trading. In 1993, Daimler-Benz reconciled its accounts to US-GAAP after seeking a listing on the New York Stock Exchange. After Daimler-Benz had broken the ice, more and more European companies started to report voluntarily according to IAS or US-GAAP. In addition, when the New Market was launched in Frankfurt in March 1997, this stock market segment was aimed at innovative and fast-growing industries in Europe, and its listing regulations explicitly required financial statements to be prepared in accordance with IAS or US-GAAP. Altogether, these developments have led to the adoption of IAS/IFRS or US-GAAP by a significant number of listed companies in the EU well before the fiscal year 2005.[3]

Despite these developments, however, at the time of writing, the jury is still out on the desirability of such a significant switch of accounting regimes (see e.g. Schipper, 2000; Ball et al., 2003). As the aim of the European Commission is to ultimately increase the comparability and quality of financial statements in the EU, the interesting question then is whether the existing differences in financial reporting across the EU Member States are due to the remaining differences between local accounting standards and practices or, at least partially, to the remaining institutional differences that influence the reporting process. We utilise the context of earnings targets to shed some early light on this issue. To the extent that benchmark beating is related to earnings management, and as we expect 'internationally recognised' accounting standards to reduce earnings management due to tighter measurement rules, less accounting choice and more transparency, we would predict less benchmark beating under international accounting standards than under local GAAP.

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[2] See Pope et al. (2002) and Dechow et al. (2003), both of whom include both cross-sectional and time-series approaches, as well as total accruals and working capital versions of the discretionary accruals model. See Beatty et al. (2002), Moehrle (2002) and Marquardt and Wiedmann (2004) for individual accruals analyses. These include, for example, discretionary reserves or loan loss provisions in the banking industry.

[3] See e.g. Gebhardt (2000) or Wagenhofer (2005) for institutional details of this process.

3. Research design

3.1. Data and definition of variables

This research uses financial statement information published by listed companies incorporated in the following EU Member States: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the UK. We excluded Luxemburg, which is by far the smallest EU Member State and for which there is insufficient data, as well as the 10 new EU Member States, whose accession in May 2004 post-dates the research period. We use data for a sample of US firms which serve as the natural benchmark against which to contrast our results for the EU. Annual financial statement data are obtained from *Worldscope* and analysts' forecast data from *I/B/E/S* as of March 2003. The research covers the years from 1986 to 2001, a period of 16 years that stretches across a range of different economic cycles, starting after the full implementation of the Fourth and Seventh Directives in all Member States and ending before the announcement of the EU policy changes that embrace IFRS.

The results reported in this paper with respect to the earnings variable (E) are based on net income after extraordinary items (WS #1651). This is consistent with Burgstahler and Dichev (1997), but contrasts with certain other studies that examine earnings before extraordinary items (Degeorge et al., 1999; Pope et al., 2002). Similarly, we use change in net income (WS $\#1651_t$ – WS $\#1651_{t-1}$) for the earnings change variable (ΔE). The net income figure has the advantage of being a reported figure that is taken directly from the financial statements, whereas other accounting numbers, including extraordinary items, are adjusted by *Worldscope* in order to make their international accounting data more comparable for practical application in investment analysis. Accordingly, such data items can be said to be stated in accordance with '*Worldscope*-GAAP' as opposed to 'Local-GAAP'.[4] For our forecast error variable (FE), we utilise the most recent consensus annual earnings per share forecast available before the announcement month and the corresponding actual earnings per share figure, both taken from I/B/E/S in order to ensure consistency.[5] The forecast error is defined as actual earnings per share ('FY-0 Actual EPS') minus the mean earnings per share forecast ('Mean Estimate').

We deflate all variables since we pool data across time and firms. In order to check the sensitivity of our results to the usage of alternative deflators, we use opening total assets (TA; WS #2999), opening fiscal year's market value of equity (MV; WS 'YrEndMarketCap') and previous year's sales (SA; WS #1001) as alternative deflators for earnings and earnings changes. Except with regard to the sensitivity analyses, all other results are reported on the basis of sales as the primary choice of deflator, as total assets can be affected by the *Worldscope* adjustments and market value of equity is subject to non-accounting effects. Forecast errors available in I/B/E/S on a per share basis are scaled in line with prior research, either by opening price per share (I/B/E/S 'Price'), total assets per share (WS #2999 / I/B/E/S 'Shares Outstanding') or actual earnings per share (I/B/E/S 'FY-0 Actual EPS'). All variables are truncated, by the top and bottom 1% of the distribution within each country subsample.

When comparing results across various reporting regimes, we first contrast the pooled EU sample with the pooled US sample. Next, we divide the EU sample into the various subgroups mentioned earlier. We start by comparing companies that are domiciled in the UK, Ireland and the Netherlands with their counterparts in the rest of the EU. We then further divide the latter grouping into three stylised sub-groups on the basis of their accounting tradition, i.e. those influenced by the kind of national accounting plan that was a longstanding feature of uniform accounting in France, or those where accounting developed in a strictly legal context, as in the case of Germany, and the group of Scandinavian countries that share a history of harmonisation that pre-dates the European Community. Although there is no common agreement on a scheme to cluster countries in the existing comparative accounting literature (e.g. Nobes and Parker, 2006; D'Arcy, 2001), it should be noted that the Nobes (1998) scheme that assigns countries into groupings based on their national accounting origins gives a similar classification for the EU, i.e.

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[4] See Thomson Financial (2002), *Worldscope* Glossary. This adjustment issue also applies to other large data-bases and stems from the perceived necessity to provide a universal schema for all firms. In addition, the definitions of special and/or extraordinary items not only differ among EU Member States, but have also changed in some countries during our sample period, see e.g. Pope et al. (2002) for the UK.

[5] See Thomson Financial (2003), *I/B/E/S* Glossary. Note that the definition of forecasted earnings (and thus also of actual earnings) by *I/B/E/S* can differ across EU Member States. Similar to prior research in this area (e.g. Pope et al., 2002), we require a minimum number of three analysts following a firm to be included in our analysis.

Defining characteristic	*Accounting origin*	*Member States of the EU*
Accounting standards	British	Ireland, Netherlands, the UK
Uniform accounting plan	French	Belgium, France, Greece, Portugal, Spain
Legal basis	German	Austria, Germany, Italy
Regional harmonisation	Scandinavian	Denmark, Finland, Sweden.

Since we analyse differences across common accounting origin clusters, those firms in the EU that report their consolidated results under IAS/IFRS or US-GAAP are excluded from these groupings and form the separate subsamples of IAS/IFRS and US-GAAP reporters. Starting with the coding of accounting standards in *Worldscope* ('AcctgStandardsFollowed'), firms have been assigned to this group when their status is confirmed by examining accounting policy disclosures in annual reports that are available on *Thomson Research*. The large majority of EU firms that have adopted IAS/IFRS during our sample period are based in Germany and similarly legalistic jurisdictions (65% of total firm-year observations), followed by France and other accounting plan regimes (18%) and Scandinavia (10%). Only 7% of IAS/IFRS observations are attributable to firms domiciled in the Netherlands and none in Ireland or the UK. For the full US-GAAP adopters, 50% of firm-year observations come from Germany alone, followed by France (19%) and the Netherlands (18%). The remaining 13% are spread across other EU Member States.[6]

Further, in order to control for potentially interfering differences in firm characteristics across our three most important subgroups, we match companies from the US, the British and the other EU accounting origin clusters according to industry (SIC-code), size (average sales) and age (based on the length of the time series of variables in the database). For this purpose, we are able to detect 1,381 companies in each group which we consider to be similar enough according to the three specified criteria.

Finally, we break up the total EU sample into the 14 EU Member States in order to report the individual results for each of the countries we have in our sample.

3.2. Methodology

3.2.1. Detecting discontinuities around targets

The following approach is used in order to test the hypothesis predicting discontinuities in the distribution of the earnings variables. First, the count density is calculated for standardised intervals of the univariate frequency distributions of (scaled) E, ΔE and FE. Focussing on the areas around the target, any discontinuities in the distributions are noted through visual inspection of the relevant histogram. For the choice of class width for each of the variables we rely on the suggestion in standard statistics textbooks which calls for a bin width of $2(IQR)n^{-1/3}$ where IQR is the interquartile range of the variable and n is the number of observations (see Venables and Ripley, 2002:112). The class width calculated according to this rule is rounded to the next sensible even number and the resultant bin size is compared to those applied in other studies in the field.[7]

The BD test statistics developed by Burgstahler and Dichev (1997) are computed in order to examine the statistical significance of any discontinuities around the target area. Since the standardised difference of the BD statistic increases approximately linearly with the square root of sample size (see Burgstahler and Eames, 2003), in sensitivity tests an adjustment is also made for differing sample sizes among subgroups when comparing the relative magnitude of these test statistics. That is to say, for each country i, the test statistics are weighted by an adjustment factor of $\mathrm{sqrt}(n_i)/\mathrm{sqrt}(n_{base})$ relative to the base country, the UK, which has the largest sub-sample amongst all EU Member States.

3.2.2. Detecting reporting strategies to achieve targets

In order to analyse the exercise of managerial discretion around certain earnings targets, the distribution of earnings is compared to the distribution of (scaled) cash flow from operations (CFO).

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[6] Note that we classify in our 'international' reporting categories only EU firms which have fully adopted IAS/IFRS or US-GAAP. For example, UK firms which are listed in the US and report reconciliations from UK- to US-GAAP are not classified as full US-GAAP firms, but as UK-GAAP firms based on their primary reporting regime.

[7] The optimal bin size according to this rule led to differing outcomes for each country mainly because of uneven sample sizes across the countries. Our choice of a common bin size applied to each country in equal measure can be considered a best compromise. Our results are robust to the application of other reasonable bin size choices.

Due to a lack of comparable data in cash flow statements in Europe during the sample period, we use the balance sheet approach in order to approximate total accruals and CFO per year t. Accruals are calculated following the method in Dechow (1994), but adjusted appropriately for changes in provisions for risks and charges in the European context:[8]

$$TACC_t = (\Delta CA_t - \Delta CASH_t) - (\Delta CL_t - \Delta STD_t - \Delta TP_t) - DEP_t - \Delta PROVISIONS_t, \quad (1)$$

where

TACC = total accruals,
ΔCA = change in current assets (Δ WS #2201),
ΔCASH = change in cash and cash equivalents (Δ WS #2001),
ΔCL = change in current liabilities (Δ WS #3101),
ΔSTD = change in short-term debt included in current liabilities (Δ WS #3051),
ΔTP = change in tax payable, if available (Δ WS #3063),
DEP = depreciation, depletion & amortisation expense (WS #1151),
ΔPROVISIONS = change in provisions for risks & charges (Δ WS #3260)
t = fiscal year.

Cash flow from operations is then determined as:

$$CFO_t = E_t - TACC_t, \quad (2)$$

where

CFO = cash flow from operations,
E = net income (WS #1651),
TACC = total accruals from equation (1),
t = fiscal year.

Three different approaches are used here to infer income smoothing. The first of these, employed in most studies on comparative income smoothing (see e.g. Langendijk and van Praag, 1996), classifies companies into two groups – smoothers and non-smoothers – on the basis of an index comparing the variability of sales (which measures the underlying degree of smoothness in a firm's activities) to the variability of reported income over time. A firm is classified as an income smoother according to the modified Eckel Index (see Eckel, 1981; Albrecht and Richardson, 1990), if:

$$CV(\Delta E_i) < CV(\Delta SALES_i) \quad (3)$$

where

CV(x) = coefficient of variation (x) = Std(x)/Mean(x),
ΔE = annual change in net income (Δ WS #1651),
ΔSALES = annual change in sales/net revenues (Δ WS #1001),
i = number of successive reporting periods.

Based on the classification of the modified Eckel Index, the percentages of smoothers are compared across samples.[9] This analysis requires that data are available for at least three consecutive periods.

The second proxy used in more recent research on comparative income smoothing is the contemporaneous correlation of the change in CFO with the change in total accruals (e.g. Leuz et al., 2003):

$$\rho(\Delta TACC, \Delta CFO) \quad (4)$$

where

ΔTACC = change in total accruals as calculated in equation (1),
ΔCFO = change in cash flow from operations as calculated in equation (2).

The underlying idea is that managers are able to use their discretion to counteract the real economic shocks to a firm's operating cash flows by adjusting accruals in the opposite direction. Accordingly, the higher is the negative correlation between changes in cash flows and changes in accruals, the greater is the presumed income smoothing activity.[10]

Finally, we propose a third proxy based on the information content in the overall distribution of earnings and earnings changes by comparing the spread of these variables. Lang et al. (2003) exploit information in the distribution of earnings, but focus on the skewness of the distribution. Instead, we argue that if smoothing exists to a larger extent in one subgroup than another, the overall distributions of both earnings and earnings changes should, *ceteris paribus*, be less spread around their means. This can be demonstrated graphically by plotting two frequency distributions side by side on the same axes, and the interquartile range (IQR) provides a suitable descriptive statistic that summarises the spread information, as follows:

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[8] Changes in provisions for risks and charges are a vital part of the accruals process in accounting regimes which provide more flexibility for such provisions, particularly in the Continental European countries. They can make up large parts of total accruals and have been identified as a key aspect of earnings management, see e.g. Choi et al. (2002):76–77. However, other comparative studies (e.g. Leuz et al., 2003) tend to disregard this accruals component when simply applying the standard formula from Dechow (1994).

[9] See Albrecht and Richardson (1990); Ashari et al., (1994); Langendijk and van Praag (1996).

[10] See e.g. Leuz et al. (2003) and Burgstahler et al. (2006). In order to ensure consistency with these prior studies, we report our results based on total assets as deflator for this measure.

$$\mathrm{IQR}(E; \Delta E) = Q_3 - Q_1 \quad (5)$$

where

IQR(x) = interquartile range of variable x,

E = net income (WS #1651), scaled by previous year's sales (WS #1001)

ΔE = change in net income (ΔWS #1651), scaled by previous year's sales (WS #1001)

Q_i = quartile i of the distribution of variable x.

Higher values of the IQR indicate earnings that are more spread and thus a lower level of income smoothing may be inferred.

In a similar spirit to Leuz et al. (2003) and Burgstahler et al. (2006), we recognise that none of the proxies reported here provide an absolute measure of income smoothing. Since we are interested in the relationship between income smoothing and benchmark beating, ranks are assigned to each proxy over the 14 EU Member States. The index is constructed such that (i) higher values of the Eckel Index, (ii) higher negative correlation between changes in accruals and cash flows and (iii) lower values of the interquartile range of (a) the earnings distribution and (b) the earnings change distribution indicate greater income smoothing. In order to reduce measurement error, the individual smoothing rankings are combined into an aggregate smoothing index. This index is computed for each subsample by averaging the ranks across all four individual smoothing scores.

Similarly, for each of the earnings benchmarks (i.e. reporting positive earnings, increasing earnings and achieving analysts' consensus forecasts), the rank is computed across the 14 Member States of the EU. Higher values of each of the relevant indicators (i.e. the ratio of small profits to small losses, the ratio of small earnings increases to small earnings decreases and the ratio of small positive to small negative forecast errors) suggest that there is more benchmark beating activity. Given that the relative ranking across countries for each earnings target may depend on the deflator used, an overall score is calculated by averaging the ranks across the results using each of the three deflators.

Finally, in order to assess the relationship between benchmark beating and income smoothing, the Spearman rank correlation is reported together with the coefficients of an OLS-regression analysis that fits at the country level each benchmark beating rank to the income smoothing index.

4. Results

4.1. Earnings targets in the EU under local GAAP

Descriptive statistics are displayed in Table 1 for earnings, in Table 2 for earnings changes and in Table 3 for forecast errors. The earnings and earnings change variables are scaled by opening total assets (TA), market value of equity (MV) and sales (SA). Forecast errors are scaled by opening price (P), total assets (TA) or absolute value of actual earnings (|ACT|). The descriptive statistics and the results are presented first for the two major economic blocs – the US and the EU – and for each accounting regime within the EU (Panel A), and then for matched samples (Panel B) and finally for each individual EU Member State (Panel C).

The number of available EU firm-year observations in each subsample depends on the deflator used. Overall, the number of firm-year earnings observations in Table 1 totals 64,397 when deflated by total assets (E/TA), 54,986 when deflated by market value (E/MV) and 61,806 when deflated by sales (E/SA). This compares with the corresponding US subsamples of 81,487 (E/TA), 72,886 (E/MV) and 79,982 (E/SA) firm-year observations, similar in magnitude to the sample sizes in US studies in this field. For the earnings changes reported in Table 2, firm-year observations for the pooled EU sample drop slightly to 64,343 (ΔE/TA), 54,969 (ΔE/MV) and 62,943 (ΔE/SA), whilst the forecast error observations in Table 3 drop more severely to 26,663 (FE/P), 23,025 (FE/TA) and 27,630 (FE/|ACT|).

When we break up the total EU sample, the subsample that comprises the UK, Ireland and the Netherlands is clearly the largest in size (≤25,981), generally followed by the plan-based French-origin grouping (≤16,433) and the law-based German-origin grouping (≤13,337), with the mixed Scandinavian grouping providing the lowest number of observations (≤7,286). Since only a limited number of EU firms have started to adopt IAS/IFRS or US-GAAP, and mainly in recent years, these subsamples are still small in size, i.e. ≤801 using IAS/IFRS and ≤559 using US-GAAP.

For the matched samples in Panel B, the number of observations in each grouping is equal since we only use matched firms where firm-year observations are available for the same fiscal year end. Given the much smaller size of the matched samples relative to the corresponding total samples, there is a trade-off between controlling for firm-characteristics across samples and losing a substantial number of observations, which should be borne in mind when interpreting the results.

With regard to the individual country statistics for each of the 14 EU Member States reported in Panel C, it is evident that there are substantial differences in the numbers of observations in each country, which depend on such factors as the size of the economy, the number of listed firms and database coverage.

4.1.1. The 'positive earnings' target

Figure 1 shows the frequency distributions of re-

Table 1
Descriptive statistics for scaled earnings

Panel A:		**E/TA**			**E/MV**			**E/SA**	
Accounting regimes	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
US	81,487	0.019	0.443	72,886	0.052	0.321	79,982	0.046	2.409
EU	64,397	0.033	0.114	54,986	0.059	0.155	61,806	0.043	0.369
British origin	25,981	0.046	0.137	23,931	0.065	0.162	24,703	0.061	0.229
French origin	16,433	0.033	0.083	13,917	0.065	0.160	15,900	0.046	0.631
German origin	13,337	0.018	0.086	10,416	0.040	0.129	12,922	0.025	0.148
Scandinavian origin	7,286	0.029	0.112	5,674	0.067	0.159	7,041	0.039	0.219
IAS/IFRS	801	0.031	0.132	653	0.048	0.122	744	0.040	0.241
US-GAAP	559	0.024	0.184	395	0.021	0.131	496	0.027	0.169

Panel B:		**E/TA**			**E/MV**			**E/SA**	
Matched sample	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
Matched US	5,548	0.039	0.126	4,014	0.061	0.194	5,550	0.042	0.297
Matched British	5,548	0.057	0.094	4,014	0.073	0.119	5,550	0.057	0.174
Matched other EU	5,548	0.022	0.063	4,014	0.039	0.112	5,550	0.022	0.139

Panel C:		**E/TA**			**E/MV**			**E/SA**	
EU Member States	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
Austria	1,269	0.019	0.066	1,090	0.046	0.108	1,214	0.030	0.218
Belgium	2,014	0.038	0.098	1,729	0.070	0.149	1,922	0.050	1.629
Denmark	2,574	0.027	0.062	2,251	0.073	0.139	2,479	0.047	0.285
Finland	1,709	0.026	0.072	1,230	0.067	0.199	1,674	0.030	0.087
France	9,930	0.031	0.081	8,340	0.064	0.152	9,674	0.039	0.272
Germany	9,483	0.020	0.107	7,105	0.034	0.122	9,220	0.021	0.144
Greece	1,567	0.053	0.105	1,308	0.057	0.127	1,517	0.083	0.352
Ireland	934	0.043	0.148	856	0.079	0.190	810	0.063	0.176
Italy	3,404	0.014	0.046	2,834	0.051	0.148	3,247	0.041	0.126
Netherlands	2,830	0.051	0.102	2,330	0.085	0.126	2,752	0.045	0.225
Portugal	959	0.023	0.056	798	0.059	0.170	908	0.050	0.168
Spain	2,241	0.033	0.062	1,990	0.070	0.205	2,147	0.069	0.251
Sweden	3,087	0.032	0.153	2,262	0.060	0.151	2,944	0.040	0.202
UK	22,396	0.046	0.140	20,863	0.062	0.164	21,298	0.063	0.231

Notes: Scaled earnings are defined as follows: E/TA is net income (WS #1651) divided by opening total assets (WS #2999); E/MV is net income (WS #1651) divided by opening market value of equity (WS 'YrEndMarketCap'); E/SA is net income (WS #1651) divided by opening sales (WS #1001). WS # is the item number in the *Worldscope* database.

Table 2
Descriptive statistics for scaled earnings changes

Panel A:		ΔE/TA			ΔE/MV			ΔE/SA	
Accounting regimes	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
US	81,419	0.002	0.247	72,804	0.006	0.291	79,837	0.007	0.913
EU	64,343	0.003	0.089	54,969	0.006	0.156	62,943	0.005	0.331
British origin	25,948	0.005	0.107	23,956	0.007	0.168	25,229	0.008	0.296
French origin	16,429	0.003	0.066	13,898	0.006	0.155	16,159	0.005	0.413
German origin	13,320	0.001	0.073	10,397	0.002	0.119	13,091	0.002	0.164
Scandinavian origin	7,281	0.003	0.078	5,669	0.007	0.170	7,156	0.004	0.338
IAS/IFRS	805	0.003	0.116	655	0.004	0.117	766	0.004	0.298
US-GAAP	560	0.001	0.135	394	0.000	0.131	542	0.003	0.452

Panel B:		ΔE/TA			ΔE/MV			ΔE/SA	
Matched sample	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
Matched US	5,566	0.005	0.099	3,997	0.007	0.176	5,403	0.005	0.152
Matched British	5,566	0.007	0.078	3,997	0.009	0.119	5,403	0.008	0.102
Matched other EU	5,566	0.001	0.051	3,997	0.003	0.098	5,403	0.002	0.076

Panel C:		ΔE/TA			ΔE/MV			ΔE/SA	
EU Member States	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
Austria	1,268	0.001	0.055	1,093	0.003	0.120	1,225	0.003	0.188
Belgium	2,014	0.002	0.088	1,733	0.007	0.150	1,974	0.005	1.050
Denmark	2,574	0.002	0.054	2,247	0.006	0.159	2,514	0.004	0.198
Finland	1,708	0.003	0.052	1,230	0.008	0.198	1,687	0.004	0.076
France	9,928	0.003	0.064	8,327	0.006	0.151	9,774	0.005	0.209
Germany	9,474	0.001	0.091	7,086	0.002	0.116	9,331	0.002	0.188
Greece	1,566	0.004	0.078	1,302	0.005	0.092	1,548	0.009	0.246
Ireland	933	0.008	0.120	858	0.014	0.209	859	0.012	0.928
Italy	3,404	0.001	0.033	2,832	0.003	0.121	3,337	0.002	0.130
Netherlands	2,827	0.006	0.072	2,321	0.010	0.131	2,786	0.006	0.157
Portugal	959	0.003	0.045	797	0.007	0.164	933	0.007	0.139
Spain	2,241	0.003	0.049	1,987	0.008	0.197	2,204	0.008	0.170
Sweden	3,083	0.004	0.104	2,261	0.007	0.164	3,019	0.005	0.486
UK	22,364	0.004	0.111	20,895	0.006	0.170	21,752	0.008	0.259

Notes: Scaled earnings changes are defined as follows: ΔE/TA is change in net income (WS #1651$_t$ – WS #1651$_{t-1}$) divided by opening total assets (WS #2999); ΔE/MV is change in net income (WS #1651$_t$ – WS #1651$_{t-1}$) divided by opening market value of equity (WS 'YrEndMarketCap'); ΔE/SA is change in net income (WS #1651$_t$ – WS #1651$_{t-1}$) divided by opening sales (WS #1001). WS # is the item number in the *Worldscope* database.

Table 3
Descriptive statistics for scaled forecast errors

Panel A:		**FE/P**			**FE/TA**			**FE/|ACT|**	
Accounting regimes	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
US	42,927	0.000	0.724	19,431	0.000	0.755	42,838	0.000	1.464
EU	26,663	0.000	0.026	23,025	0.000	0.763	27,630	0.000	0.447
British origin	11,549	0.000	0.020	9,851	0.001	1.166	11,883	0.002	0.280
French origin	6,393	0.000	0.023	5,528	0.000	0.018	6,661	0.000	0.465
German origin	5,019	0.000	0.035	4,463	0.000	0.028	5,229	0.000	0.571
Scandinavian origin	3,044	0.000	0.031	2,521	0.000	0.028	3,182	0.000	0.624
IAS/IFRS	365	0.000	0.033	372	0.000	0.053	376	0.000	0.531
US-GAAP	293	0.000	0.035	290	0.000	0.045	299	0.000	0.409

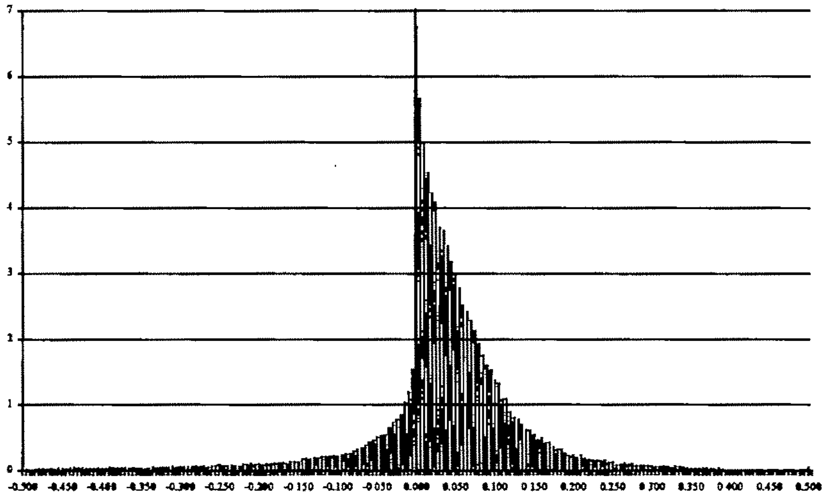
Panel B:		**FE/P**			**FE/TA**			**FE/|ACT|**	
Matched sample	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
Matched US	497	0.000	0.008	500	0.000	0.011	501	0.014	0.191
Matched British	497	0.001	0.011	500	0.130	0.746	501	0.017	0.155
Matched other EU	497	0.000	0.026	500	0.000	0.009	501	0.000	0.382

Panel C:		**FE/P**			**FE/TA**			**FE/|ACT|**	
EU Member States	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*	*N*	*Median*	*Std.*
Austria	742	0.000	0.019	572	0.000	0.012	785	0.000	0.474
Belgium	769	0.000	0.019	663	0.000	0.019	799	0.000	0.496
Denmark	1,231	0.000	0.029	938	0.000	0.019	1,337	0.000	0.477
Finland	742	0.000	0.037	646	0.000	0.023	752	0.000	0.556
France	3,430	0.000	0.021	2,968	0.000	0.017	3,545	0.000	0.442
Germany	3,060	0.000	0.033	2,842	0.000	0.038	3,145	0.000	0.503
Greece	695	0.000	0.025	604	0.000	0.028	722	0.000	0.503
Ireland	473	0.001	0.052	427	0.005	0.537	478	0.015	0.358
Italy	1,582	0.000	0.044	1,427	0.000	0.014	1,682	0.000	0.697
Netherlands	1,853	0.000	0.027	1,632	0.000	0.016	1,914	0.000	0.359
Portugal	317	0.000	0.022	264	0.000	0.013	332	0.000	0.478
Spain	1,373	0.000	0.026	1,218	0.000	0.014	1,455	0.000	0.467
Sweden	1,127	0.000	0.028	988	0.000	0.038	1,149	0.000	0.800
UK	9,269	0.000	0.014	7,836	0.040	1.301	9,535	0.003	0.256

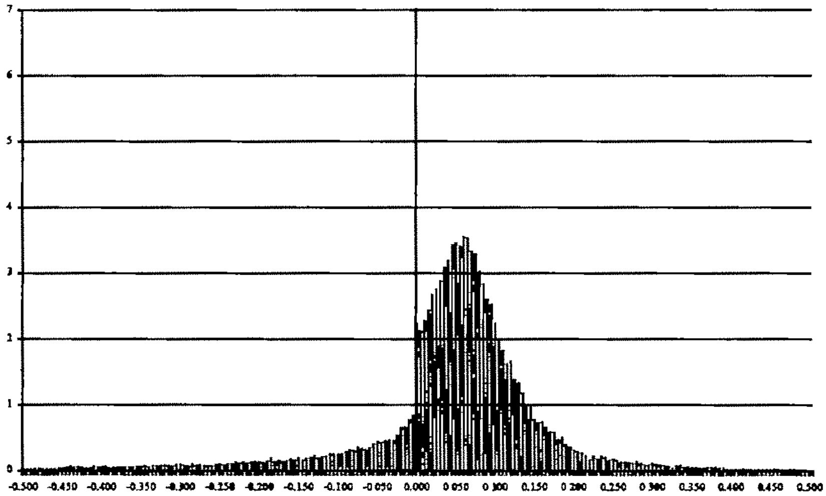
Notes: Scaled forecast errors are defined as follows: FE/P is actual earnings minus forecast earnings at the announcement date, divided by opening price in I/B/E/S; FE/TA is actual earnings minus forecasted earnings at the announcement date in I/B/E/S, divided by opening total assets in *Worldscope* (WS #2999); FE/|ACT| is actual earnings minus forecast earnings at the announcement date, divided by the absolute value of actual earnings in I/B/E/S. WS # is the item number in the *Worldscope* database. We require a minimum number of three analysts following a firm to be included in the sample.

Figure 1
Scaled earnings in the EU

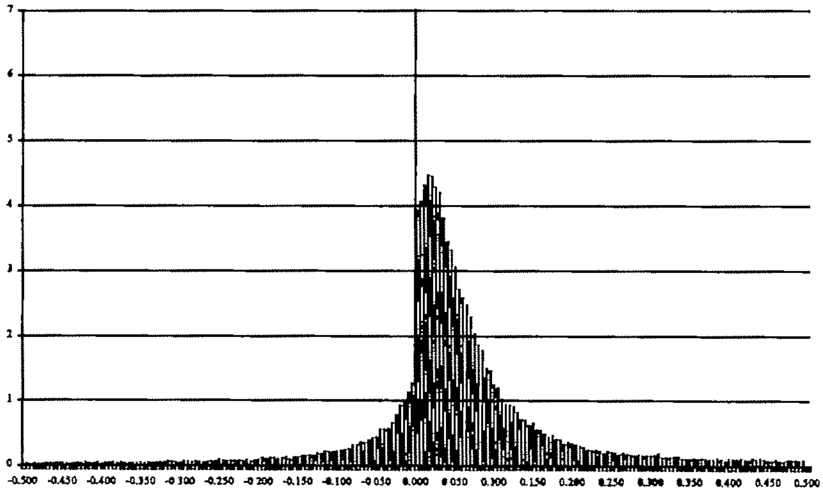
Panel A: Earnings scaled by total assets (n=64,397)



Panel B: Earnings scaled by market value of equity (n=54,986)



Panel C: Earnings scaled by sales (n=61,806)



ported net income for the total EU sample, pooled across firms and time, and scaled by total assets (Panel A), market value of equity (Panel B) or sales (Panel C). The shape of each distribution to the left of zero (negative earnings) appears very different from its counterpart to the right of zero (positive earnings). More specifically, all three distributions show not only a distinct discontinuity around zero, but a substantial 'jump' just above zero. These discontinuities are far more pronounced than the 'kink' that has been documented in the scaled earnings distributions of prior studies using US data (see e.g. Burgstahler and Dichev, 1997:109). A comparison between the three frequency distributions also shows that the magnitude of the discontinuities as well as the functional form of the overall distribution depends much on the deflator used to scale earnings. The discontinuities appear to be particularly acute when earnings are scaled by total assets, but less severe when scaled by the market value of equity (although still larger than in the US).

The general visual impression from the frequency distribution histograms is supported by the ratio of small profits to small losses that is given in Table 4, Panel A. This ratio ranges from 2.68 to 4.43 for the total EU sample depending on the deflator used, which indicates that about three times as many small profits as small losses were reported in the EU over the sample period. When tested for statistical significance, the frequency of the class immediately left of zero (–0.005 : 0] is significantly lower than expected and the frequency in the class immediately to the right of zero [0 : 0.005) is significantly higher than expected had the distribution been smooth. The BD test statistics are highly significant at the 1% level with values of –34.0, –12.4 and –19.4 for the class immediately below zero and of 28.5, 10.3 and 13.6 for the class immediately above zero, depending on the deflator, i.e. TA, MV and SA respectively. The ratios of small profits to small losses for the US-sample are in the range of only 1.93 to 2.77; furthermore, the magnitude of the BD test statistics is much smaller for the US. To the extent that such discontinuities capture earnings management, this suggests that such practices occur to a greater extent in the EU than in the US.

When we separate out the British accounting origin sample, which is also shown in Panel A of Table 4, we find that the magnitude of the discontinuity for the other accounting regimes in the EU are typically larger than for the British grouping alone (range 2.09 to 2.78), the latter being more comparable in magnitude to the US (range 1.93 to 2.77). The same is true for the BD test statistics and holds for alternative deflators.

Looking at the matched US, British accounting origin and Other EU samples in Panel B, and thus attempting to control for the effects of potentially different sample firm characteristics, companies in the British accounting origin sample appear to practice even less benchmark beating than their matched US counterparts. Still, the ratios of small profits to small losses as well as the BD test statistics appear to be highest for the rest of the EU.

Figure 2 illustrates our findings graphically for earnings deflated by sales. The overall distribution of earnings of firms operating under an accounting regime of British origin (in Panel A2) tends generally to be more comparable to the distribution of earnings of US firms (in Panel A1) rather than that of their counterparts reporting under any other local accounting regime elsewhere in the EU (in Panel A3) – despite the various efforts towards accounting harmonisation in Europe. This result holds also for the matched firm samples in Figure 2, Panels B1 to B3.

It can also be seen in Panel A of Table 4 that firms from the law-based regimes of German origin show the greatest magnitude of discontinuity around the positive earnings target as measured both by the ratio of small profits to small losses and by the BD test statistics. The results for the individual EU Member States are reported in Panel C of Table 4, where it can be seen that achieving reportable profits proves to be generally an important target for EU companies as the ratio of small profits to small losses is always above one (for all countries and all deflators) and the BD test statistics are mostly highly significant. Firms in Austria, Germany and Italy record relatively high profit-loss ratios (3.00, 3.71 and 4.62 for the sales deflator), and the same can be said for the respective BD test statistics, whereas the ratios for Ireland and the UK are amongst the smallest (2.50 and 2.46). The results for alternative deflators are very comparable. Also, when the BD test statistics are adjusted for the different sizes of the samples, the results for the UK and Ireland (not reported in the Table) are the lowest in Europe, and in the Irish case the BD test statistics are even insignificant.

A notable exception in the context of the standard classification scheme that we have used to group the Member States is the Netherlands, which has been included with the UK and Ireland in the British origin group of countries with a history of standard setting that started in the audit profession. However, the Netherlands has a particularly high ratio of small profits to small losses (8.27 for the sales deflator). To sum up, the analysis of individual Member States generally shows benchmark beating to be dissimilar across accounting regimes, particularly when polarising the strictly law-based regimes on the one hand and the delegated approach to standard setting on the other.

Our findings in this section are summarised by

Table 4
Test statistics around the 'positive earnings' target

Panel A: **Accounting regimes**	**#SmProfit/#SmLoss** *E/TA*	*E/MV*	*E/SA*	**BD test statistics** *E/TA*		*E/MV*		*E/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
US	2.77	1.93	2.31	–19.7***	–3.8***	–8.6***	6.9***	–14.2***	10.5***
EU	4.43	2.68	3.11	–34.0***	28.5***	–12.4***	10.3***	–19.4***	13.6***
British origin	2.78	2.09	2.78	–10.4***	5.5***	–6.0***	3.9***	–9.3***	6.9***
French origin	4.34	3.25	2.67	–17.1***	12.7***	–7.0***	5.2***	–8.2***	5.3***
German origin	6.91	3.39	3.72	–28.1***	26.1***	–8.2***	7.8***	–13.1***	7.8***
Scandinavian origin	3.46	2.43	3.13	–9.8***	8.8***	–3.1***	2.8***	–7.2***	7.1***

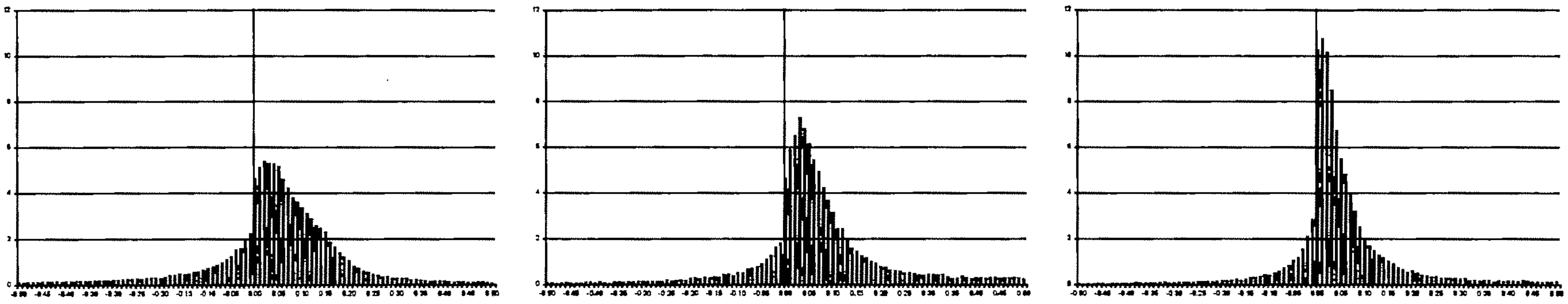
Panel B: **Matched sample**	**#SmProfit/#SmLoss** *E/TA*	*E/MV*	*E/SA*	**BD test statistics** *E/TA*		*E/MV*		*E/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
Matched US	3.00	3.35	2.89	–6.0***	3.3***	–4.1***	3.3***	–5.8***	5.3***
Matched British	2.91	1.71	2.17	–4.6***	0.9	1.7*	1.7*	–3.0***	2.0**
Matched other EU	3.96	2.95	3.16	–9.7***	8.7***	–4.5***	3.0***	–7.1***	5.1***

Panel C: **EU Member States**	**#SmProfit/#SmLoss** *E/TA*	*E/MV*	*E/SA*	**BD test statistics** *E/TA*		*E/MV*		*E/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
Austria	9.50	2.83	3.00	–11.3***	11.5***	–1.9*	2.4**	–2.6***	0.9
Belgium	5.60	2.29	2.37	–7.6***	7.8***	–1.4	0.0	–2.7***	1.5
Denmark	3.40	2.23	2.52	–5.7***	2.4**	–1.8*	0.9	–3.2***	2.0**
Finland	3.60	3.56	3.49	–5.5***	5.9***	–2.8***	1.9*	–4.2***	4.4***
France	3.70	2.37	2.37	–11.7***	9.0***	–3.8***	3.0***	–5.7***	2.9***
Germany	7.00	3.21	3.71	–22.8***	23.5***	–6.7***	6.7***	–11.6***	6.9***
Greece	4.70	4.69	3.12	–5.0***	4.9***	–4.4***	3.4***	–2.4	3.1***
Ireland	2.30	1.44	2.50	–1.2	–1.4	–0.5	0.5	–1.2	2.1**
Italy	6.30	5.07	4.62	–13.6***	8.2***	–5.3***	4.2***	–6.7***	4.3***
Netherlands	9.30	6.60	8.27	–8.2***	3.7***	–4.0***	1.1	–7.2***	3.9***
Portugal	8.80	7.50	4.57	–7.2***	4.0***	–2.9***	1.0	–3.2***	2.4**
Spain	5.30	6.00	5.00	–5.5***	0.8	–3.5***	3.3***	–4.4***	3.2***
Sweden	3.30	2.04	3.14	–5.6***	6.8***	–1.0	1.9*	–4.7***	5.4***
UK	2.50	1.99	2.46	–8.4***	5.0***	–5.3***	3.7***	–7.4***	5.5***

Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. #SmProfit/#SmLoss is the number of small profits to small losses; a firm year observation is defined as a small profit if scaled net earnings is in the range (0 : 0.005]; a firm year observation is defined as a small loss if scaled net earnings is in the range [–0.005 : 0). Scaled net earnings are as follows: E/TA is net income (WS #1651) divided by opening total assets (WS #2999); E/MV is net income (WS #1651) divided by opening market value of equity (WS 'YrEndMarketCap') and E/SA is net income (WS #1651) divided by opening sales (WS #1001). WS # is the item number in the *Worldscope* database. BD test statistics measure the level of significance of a discontinuity around an earnings target area.

Figure 2
Earnings scaled by sales – a comparison across accounting regimes

Panel A1: US – full sample (n=79,982) **Panel A2:** British origin – full sample (n=24,703) **Panel A3:** Other EU – full sample (n=35,863)



Panel B1: US – Matched sample (n=5,550) **Panel B2:** British origin – matched sample (n=5,550) **Panel B3:** Other EU – matched sample (n=5,550)

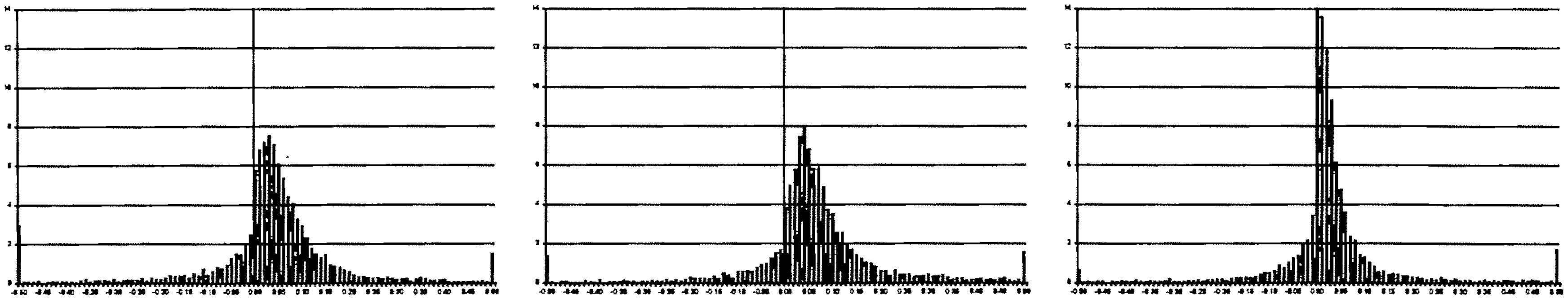
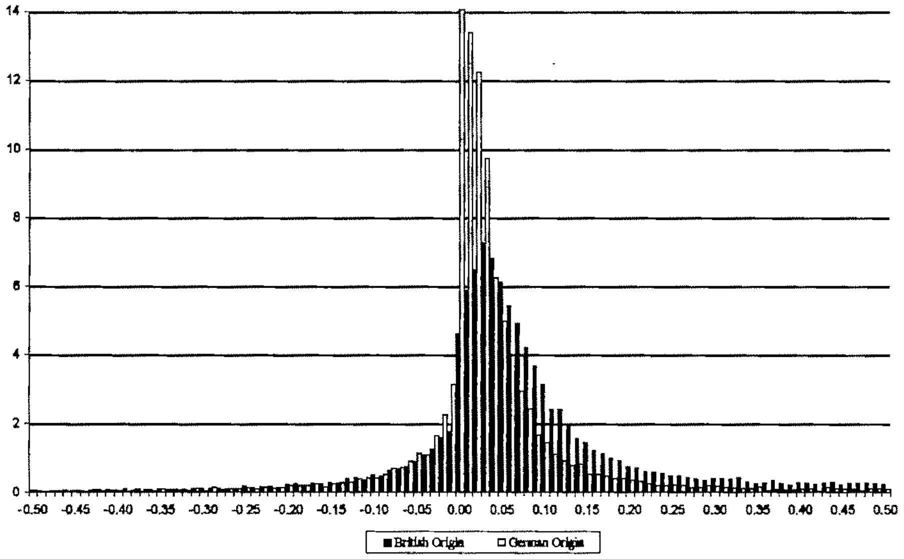


Figure 3
British and German accounting regimes compared

Panel A: Earnings scaled by sales
(n=24,703 for British origin, n=12,922 for German origin)



Panel B: Earnings changes scaled by sales
(n=25,229 for British origin, n=13,091 for German origin)

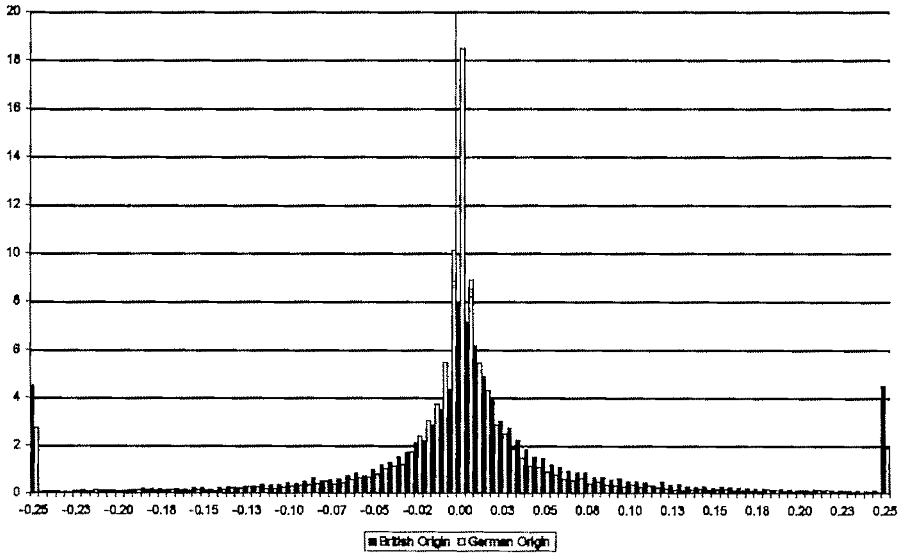


Figure 3, Panel A in which we plot together the earnings distributions of the two boundary regimes, with the darkly shaded histogram presenting the earnings distribution for the British and the lightly shaded histogram that of the German accounting origin regimes. The figures illustrate not only that the discontinuities in the distributions are much larger for firms in the German origin jurisdictions, but also that the distribution of earnings is more spread for those of British origin. The distribution of earnings under the German regime tends not only to be more clustered around the mean, but average earnings also tend to be lower. The impression gained from the graphs is consistent with the means, medians and standard deviations of the scaled earnings variables reported in Table 1, Panel A.

The different distributions could be caused by different profit generating processes and economic performance across the countries studied. However, they would also be consistent with the existence of dissimilar approaches to accounting choice within the EU. German origin companies seem to strive to avoid losses and to show small profits. In these countries, there is a stronger link between financial accounting and tax accounting providing a possible explanation for the observed phenomenon (see Hoogendoorn, 1996). By deferring gains companies can reduce the present value of tax payments and escape future losses which imply that the benefits of the tax deductibility of expenses cannot be used immediately or fully as the tax rules often restrict loss carry forwards.

In addition, dividend distributions are *de jure* and *de facto* linked to the profits reported in the financial statements in these countries (see Pellens et al., 2003 for a survey of German companies). Companies that want to follow a stable dividend pay out strategy have an incentive to 'store' profits for future periods for which reported earnings would not allow the continuation of the desired dividend payout policy. On the other hand, companies that want to restrict dividends have an incentive to reduce and to delay profit recognition as company law requires a minimum pay out of 50 percent of the profit of the year.[11]

4.1.2. The 'positive earnings change' target

Figure 4 plots the distributions of changes in reported net income for the total EU sample, scaled by total assets in Panel A, by market value of equity in Panel B and by sales in Panel C. All three distributions peak in the small positive earnings changes class slightly above the last year earnings benchmark [0 : 0.005) whereas the percentage of observations in the class slightly below the previous year's earnings is much lower. This contrasts with prior evidence from the US (e.g. Burgstahler and Dichev, 1997:105) and the UK (Pope et al., 2002), in which the scaled earnings changes distributions show only a discontinuity and 'kink' around last year's earnings target area in an otherwise more normally shaped distribution. The null hypothesis of no discontinuity is rejected at high significance levels using the BD test statistics (Table 5). Using a bin size of 0.005, the test statistics in the EU for the class immediately below zero (small decreases in earnings) are –9.5, –5.3 and –9.4 and those for the class immediately above zero (small increases in earnings) are 31.4, 10.1 and 15.3 when deflated by TA, MV or SA, confirming at the 1% significance level the inferences drawn from the visual inspection of the frequency distributions.

Looking at the ratio of small earnings increases to small earnings decreases and the corresponding test statistics in Table 5, the results show that achieving growth in earnings relative to last year appears to be an important goal throughout the EU. The ratio is well above one for each type of accounting regime and each Member State, with most of the BD test statistics being significant. However, the ratios in Table 5 are mostly in the range 1.3 to 2.3 and therefore much lower than the ratios of small profits to small losses reported in Table 4. This would seem to confirm the findings of Degeorge et al. (1999), who show that achieving a profit is the first priority, over and above other earnings targets.

In the case of earnings changes, the results do not differ clearly between the sub-samples, as their ranking on the basis of the ratio of small increases to small decreases is largely dependent on the deflator used. For instance, comparing the EU to the US, the ratio is higher for the US than for the EU when total assets is the deflator (2.27 vs. 1.81), but lower when earnings changes are deflated by market value (1.48 vs. 1.54) or sales (1.54 vs. 1.72). The same applies within the EU when we consider the groupings by accounting origin. Moreover, looking at the results for the three matched samples in Panel B of Table 5, the ratios of small profit increases to small profit decreases are at a similar level, e.g. British origin 1.58, US 1.68 and other EU 1.68 with sales as the deflator.

The results for our two extreme groupings suggest that firms operating within the kind of regulatory framework characterised by the UK appear to exercise less managerial discretion than their counterparts in accounting regimes of German origin. In the superimposed frequency distributions in Panel B of Figure 3, it can be seen that earnings changes in the British grouping are more widely dispersed, and in the case of the German grouping

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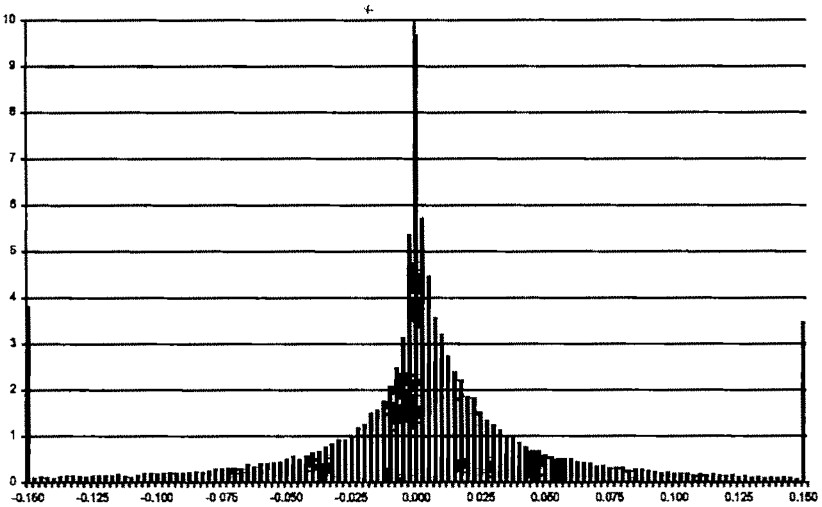
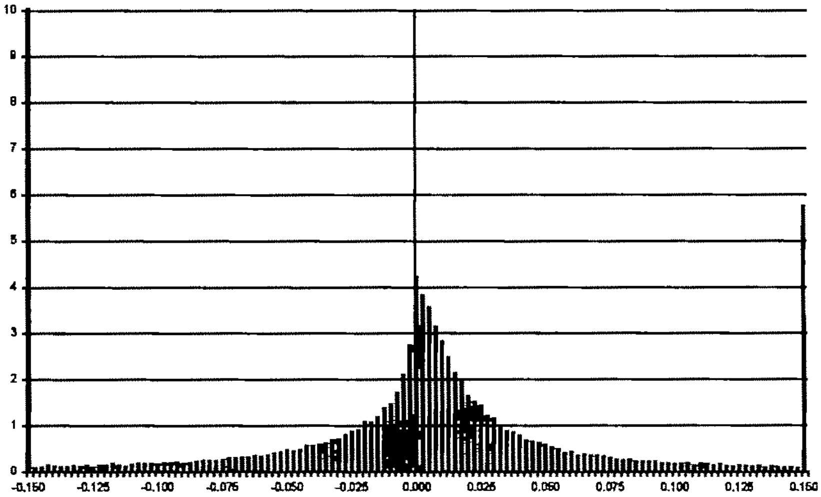
[11] For higher retentions the management of a German *Aktiengesellschaft* (company limited by shares) needs the approval of the shareholders' meeting. See §58 *Aktiengesetz* (law on companies limited by shares).

Figure 4
Earnings changes in the European Union

Panel A: Earnings changes scaled by total assets (n=64,343)



Panel B: Earnings changes scaled by market value of equity (n=54,969)



Panel C: Earnings changes scaled by sales (n=62,943)

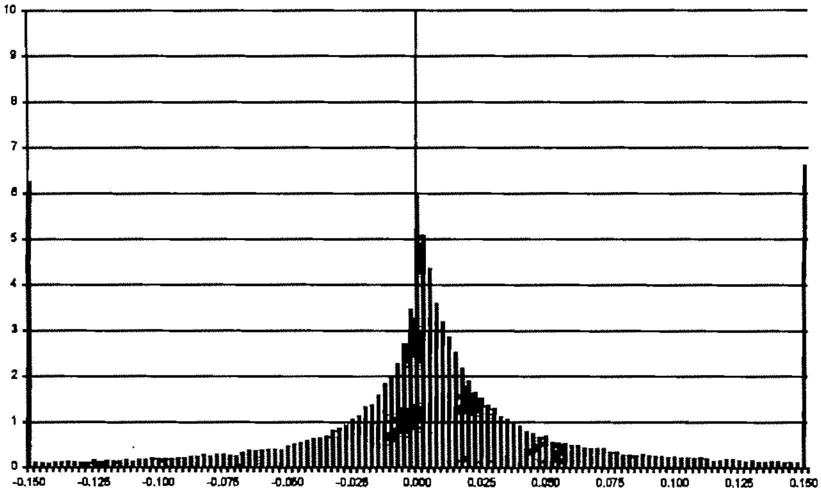


Table 5
Test statistics around the 'positive earnings changes' target

Panel A:	**#SmPos. ΔE/#SmNeg. ΔE**			**BD test statistics**					
Accounting Regimes	*ΔE/TA*	*ΔE/MV*	*ΔE/SA*	*ΔE/TA*		*ΔE/MV*		*ΔE/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
US	2.27	1.48	1.54	–19.9***	39.2***	–6.4***	5.0***	–6.6***	8.3***
EU	1.81	1.54	1.72	–9.5***	31.4***	–5.3***	10.1***	–9.4***	15.3***
British origin	1.67	1.34	1.74	–3.7***	13.2***	–0.8	3.5***	–6.6***	4.9***
French origin	2.05	1.56	1.68	–8.5***	17.4***	–3.2***	3.2***	–4.3***	6.1***
German origin	1.95	1.93	1.82	–5.5***	24.4***	–5.2***	10.9***	–5.2***	14.9***
Scandinavian origin	1.32	1.42	1.63	–0.4	4.6***	–2.2**	1.8*	–2.6***	2.8***

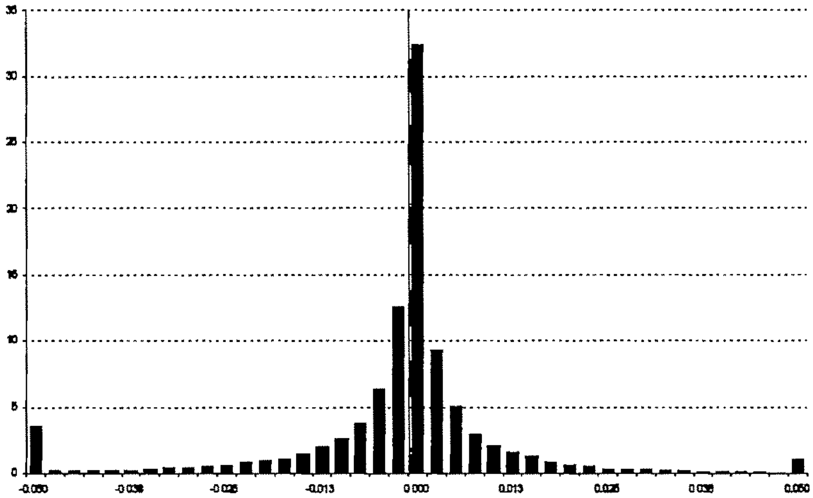
Panel B:	**#SmPos. ΔE/#SmNeg. ΔE**			**BD test statistics**					
Matched Sample	*ΔE/TA*	*ΔE/MV*	*ΔE/SA*	*ΔE/TA*		*ΔE/MV*		*ΔE/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
Matched US	1.74	1.59	1.68	–3.0***	7.6***	–2.7***	0.7	–3.3***	3.9***
Matched British	1.71	1.42	1.58	–2.4**	7.2***	–0.9	–0.2	–2.4**	3.4***
Matched other EU	1.75	1.88	1.68	–2.7***	15.2***	–3.9***	9.0***	–2.2**	13.8***

Panel C:	**#SmPos. ΔE/#SmNeg. ΔE**			**BD test statistics**					
EU Member States	*ΔE/TA*	*ΔE/MV*	*ΔE/SA*	*ΔE/TA*		*ΔE/MV*		*ΔE/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
Austria	1.69	1.49	1.45	–0.1	6.8***	0.1	1.5	–0.1	1.9*
Belgium	2.07	1.44	1.81	–2.8***	7.1***	–0.7	1.0	–1.5	2.5**
Denmark	1.24	1.50	1.39	0.3	2.4**	–1.9*	1.0	–0.6	0.8
Finland	1.37	1.04	1.36	–0.4	2.8***	–0.2	0.0	–1.7*	1.1
France	1.88	1.59	1.61	–4.8***	12.4***	–2.5**	2.3**	–2.8***	4.3***
Germany	1.97	1.83	1.76	–5.1***	18.7***	–3.6***	8.7***	–3.7***	12.5***
Greece	1.83	1.42	1.90	–2.3**	2.5**	–1.5	1.8*	–1.9*	2.7***
Ireland	2.19	1.62	1.44	–1.2	2.9***	–0.8	0.8	–0.1	–0.2
Italy	1.94	2.45	2.14	–2.5**	14.0***	–4.7***	6.4***	–4.2***	7.6***
Netherlands	3.00	2.08	3.09	–6.0***	8.9***	–2.5**	1.9*	–6.4***	5.6***
Portugal	2.31	1.30	1.27	–3.6***	5.1***	0.0	0.8	0.1	0.1
Spain	2.89	1.86	2.17	–6.3***	8.5***	–1.6	1.1	–3.6***	2.9***
Sweden	1.38	1.55	1.68	–0.6	2.8***	–1.5	1.7*	–2.3**	2.9***
UK	1.52	1.29	1.52	–1.6	10.2***	–0.1	3.1***	–4.4***	2.6***

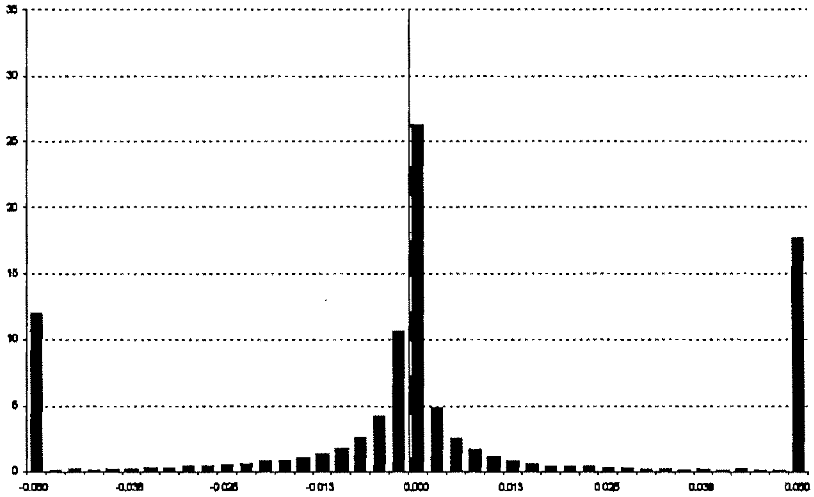
Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. #SmPos. ΔE/#SmNeg. ΔE is the number of small positive earnings changes to small negative earnings changes over a financial year; a firm year observation is defined as a small positive earnings change if the scaled earnings change is in the range [0 : 0.005); a firm year observation is defined as a small negative earnings change if the scaled earnings change is in the range [–0.005 : 0). Scaled earnings changes are as follows: ΔE/TA is change in net income (WS #1651$_t$ – WS #1651$_{t-1}$) divided by opening total assets (WS #2999); ΔE/MV is change in net income (WS #1651$_t$ – WS #1651$_{t-1}$) divided by opening market value of equity (WS 'YrEndMarketCap') and ΔE/SA is change in net income (WS #1651$_t$ – WS #1651$_{t-1}$) divided by opening sales (WS #1001). WS # is the item number in the *Worldscope* database. BD test statistics measure the level of significance of a discontinuity around an earnings target area.

Figure 5
Forecast errors in the European Union

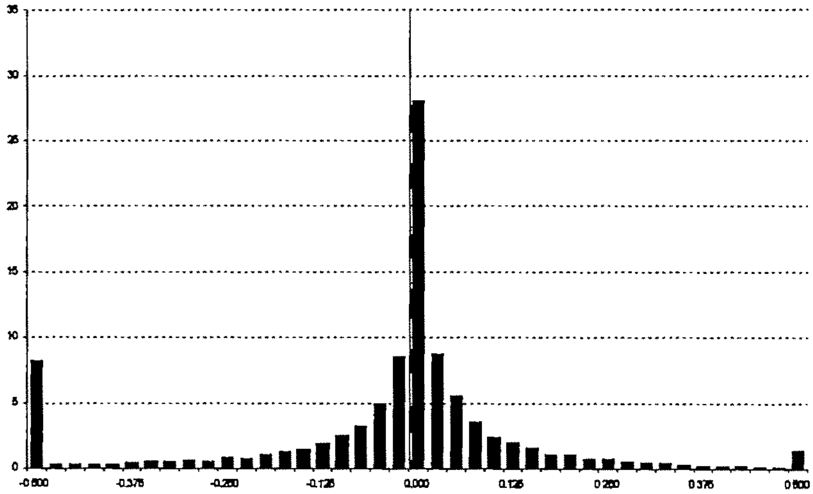
Panel A: Forecast errors scaled by price (n=26,663)



Panel B: Forecast errors scaled by total assets (n=23,025)



Panel C: Forecast errors scaled by absolute value of actuals (n=27,630)



that they are more clustered around their mean. This result is consistent with the lower standard deviation of scaled earnings changes in Table 2, where the median earnings change is also lower in the German origin regimes. However, within the two groupings, the results on the magnitude of the ratio of small profit increase to small profit decrease as well as the BD test statistics are not consistent across the corresponding countries and the deflators used (Table 5, Panel C).

4.1.3. The 'positive earnings surprise' target

The descriptive statistics for scaled forecast errors in the month of the earnings announcement were presented in Table 3. For most countries, the median forecast error is zero (an unbiased forecast), although for Ireland and the UK (when scaled by TA, |ACT|) it is positive (a pessimistic forecast). Note that these descriptives do not correspond to the general finding of analyst optimism in predictions that has been reported for samples of annual earnings forecasts that are pooled over the full 12-month forecasting horizon (e.g. Capstaff et al., 2001), but are in line with the recent US literature documenting unbiased or even pessimistic forecasts around the announcement date (e.g. Matsumoto, 2002), which is the date that we analyse here.

Figure 5 presents the distributions of scaled forecast errors at the time of the earnings announcement, scaled by price in Panel A, total assets in Panel B (both bin sizes of 0.0025) and the absolute value of actual earnings in Panel C (bin size of 0.025). The frequency distributions peak in the area above the zero line. The percentage of small positive forecast errors immediately above zero [0 : 0.025) varies between 27% when scaled by TA and 32% when scaled by price while the percentage of small negative forecast errors that are slightly below zero (–0.0025 : 0] is considerably lower, varying between 8% when scaled by actuals and 12% when scaled by price. It can be seen in Table 6 that the ratio of such small positive to small negative forecasts errors varies between 2.45 and 3.29 depending upon the deflator in the EU, which is highly significant under the BD test. Hence, the evidence reported here shows that meeting or beating analysts' earnings forecasts is an important benchmark for EU companies.

Although the analysis of the full EU sample suggests that the ratio of small positive to small negative forecast errors is lower than the corresponding ratio in the US, which itself is similar to that reported by Brown and Higgins (2001), this is no longer true for the matched samples (see Panel B of Table 6). Generally, the results depend on the deflator used, and this applies also to the analysis by accounting regime and by Member State. For example, in the latter case, while the UK has a ratio of small positive to small negative earnings surprises of 2.84 when forecast errors are scaled by price, the corresponding ratio is as high as 10.84 when scaled by total assets.

In Table 6, Panel C, for each of the individual countries, the ratios of small positive to small negative forecast errors are well above one for all countries and for all deflators. Thus, these findings at the country level provide further evidence that achieving the level of earnings expected by financial analysts is a universally important target – despite the differences in the information environment and hence the importance and properties of analysts' forecasts in general across the EU Member States (see e.g. Capstaff et al., 2001).

4.2. Earnings targets and managerial discretion

4.2.1. The distribution of cash flows from operations

In order to investigate whether the observed discontinuities are due to the accruals process in accounting or some statistical artefact, we first analyse the cash flow and accruals components of earnings, as cash flow from operations (CFO) stems from the economic activities of the firms and is generally not subject to managerial accounting discretion. Panel A of Table 7 reports descriptive statistics for the cash flow and accrual components of earnings, earnings changes and forecast errors. As compared to the scaled earnings analysis, we lose a considerable number of observations due to the unavailability of data in *Worldscope* necessary to calculate accruals and cash flows. Consistent with prior research, on average, total accruals have negative mean values whereas the mean cash flow from operations is positive. The smoothing nature of the accruals is documented by the spread of the distributions, the standard deviations being higher for CFO and the change in CFO than for earnings and the change in earnings.

The frequencies for the EU as a whole are plotted in Panels A1 and A2 of Figure 6. The distribution of earnings is compared with the distribution of cash flow in Panel A1, where both are scaled by sales. For equal numbers of firm-year observations (n=42,658), the frequency distribution of earnings shows a substantial discontinuity around zero, but its (lighter shaded) complement for cash flow is smooth in this area. This suggests that the accruals process will have caused the discontinuity in the earnings distribution. The same finding applies to the changes in both earnings and cash flow in Panel A2, with the distribution of changes in cash flow showing no discontinuity around the target area. This impression of no discontinuity for cash flow holds throughout the EU, as exemplified in Panels B1 and B2 of Figure 6 where the distributions for cash flow (B1) and change in cash flow

Table 6
Test statistics around the 'positive forecast errors' target

Panel A:	**#SmPos. FE/#SmNeg. FE**			**BD test statistics**					
Accounting regimes	*FE/P*	*FE/TA*	*FE/|ACT|*	*FE/P*		*FE/TA*		*FE/|ACT|*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
US	2.90	3.19	3.52	–45.5***	107.1***	–32.5***	72.3***	–53.2***	87.3***
EU	2.57	2.45	3.29	–26.8***	68.3***	–17.9***	58.7***	–36.3***	66.2***
British origin	2.88	7.45	3.32	–21.5***	52.5***	–28.9***	40.8***	–25.6***	48.6***
French origin	1.84	1.64	2.41	–5.0***	25.3***	0.0	25.4***	–11.0***	25.8***
German origin	3.53	2.41	6.76	–19.7***	32.8***	–10.1***	32.9***	–27.4***	34.2***
Scandinavian origin	2.02	1.59	2.63	–5.0***	16.3***	0.0	14.3***	–8.2***	16.9***

Panel B:	**#SmPos. FE/#SmNeg. FE**			**BD test statistics**					
Matched sample	*FE/P*	*FE/TA*	*FE/|ACT|*	*FE/P*		*FE/TA*		*FE/|ACT|*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
Matched US	1.81	1.75	0.80	–0.3	11.4***	0.0	12.5***	–1.5	–4.0***
Matched British	2.01	2.00	1.00	–1.0	11.3***	0.0	–0.5	–0.7	–0.8
Matched other EU	2.80	2.00	2.70	–5.0***	12.1***	–1.4	13.1***	–11.6***	11.7***

Panel C:	**#SmPos. FE/#SmNeg. FE**			**BD test statistics**					
EU Member States	*FE/P*	*FE/TA*	*FE/|ACT|*	*FE/P*		*FE/TA*		*FE/|ACT|*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
Austria	4.12	2.39	7.97	–8.9***	14.1***	–3.6***	12.4***	–12.4***	15.3***
Belgium	1.99	1.68	2.97	–2.8***	8.7***	–0.1	8.4***	–5.5***	9.9***
Denmark	2.23	1.79	2.75	–3.6***	13.5***	–0.7	10.5***	–5.7***	14.2***
Finland	3.41	1.99	4.21	–6.7***	7.4***	–2.8***	8.1***	–6.5***	7.8***
France	1.43	1.29	1.61	1.8*	15.2***	5.1***	14.4***	–0.9	12.9***
Germany	4.27	3.23	9.66	–19.3***	30.0***	–13.4***	30.4***	–25.9***	29.6***
Greece	2.57	2.23	4.38	–4.5***	8.2***	–3.2***	6.1***	–6.5***	9.0***
Ireland	6.04	16.00	5.89	–8.9***	10.9***	–9.8***	11.0***	–8.0***	9.3***
Italy	2.01	1.53	3.23	–4.3***	11.3***	0.2	12.8***	–8.0***	12.7***
Netherlands	2.79	2.69	3.10	–7.9***	21.2***	–7.6***	21.0***	–9.7***	20.9***
Portugal	2.80	2.64	6.80	–3.5***	5.1***	–3.6***	7.2***	–6.7***	7.0***
Spain	2.75	2.35	3.90	–7.4***	17.4***	–4.3***	19.2***	–11.6***	19.0***
Sweden	1.47	1.27	1.99	–0.3	7.0***	2.5**	6.7***	–3.0***	6.6***
UK	2.84	10.84	3.30	–18.8***	47.1***	–35.4***	35.3***	–22.6***	43.1***

Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. #SmPos. FE /#SmNeg. FE is the number of small positive forecast errors to small negative forecast errors at the announcement date; a firm year observation is defined as a small positive forecast error if scaled forecast errors are in the range [0 : 0.0025); a firm year observation is defined as small negative forecast error if scaled forecast errors are in the range [–0.0025 : 0). Scaled forecast errors are defined as follows: FE/P is actual earnings minus forecasted earnings at the announcement date, divided by the opening price in I/B/E/S; FE/TA is actual earnings minus forecasted earnings at the announcement date in I/B/E/S, divided by opening total assets in *Worldscope* (WS #2999) and FE/|ACT| is actual earnings minus forecast earnings at the announcement date divided by the absolute value of actual earnings in I/B/E/S. We require a minimum number of three analysts following a firm to be included in the sample. BD test statistics measure the level of significance of a discontinuity around an earnings target area.

Table 7
Earnings targets, accruals and cash flow from operations in the EU

Panel A: **Descriptive statistics**	*N*	*Mean*	*Median*	*Std*	*25%*	*75%*
Earnings	42,658	0.042	0.037	0.108	0.010	0.078
Cash flow from operations	42,658	0.085	0.071	0.147	0.019	0.138
Total accruals	42,658	–0.042	–0.036	0.127	–0.087	0.005
Δ Earnings	37,081	0.000	0.004	0.103	–0.015	0.022
Δ Cash flow from operations	37,081	0.007	0.005	0.160	–0.049	0.061
Δ Total accruals	37,081	–0.007	–0.004	0.148	–0.057	0.047
Forecast error	16,255	–0.005	0.000	0.532	–0.011	0.017
Cash flow from operations	16,255	0.100	0.097	0.109	0.046	0.154
Total accruals	16,255	–0.038	–0.041	0.092	–0.083	0.001

Panel B:	**#SmPositive CFO/#SmNegative CFO**			**#SmPositiveΔCFO/#SmNegativeΔCFO**		
Ratio analysis	*CFO/TA*	*CFO/MV*	*CFO/SA*	*ΔCFO/TA*	*ΔCFO/MV*	*ΔCFO/SA*
Austria	1.90	0.86	2.11	0.75	0.75	0.78
Belgium	0.53	0.44	0.58	0.72	0.59	0.78
Denmark	0.69	0.83	0.74	0.77	1.27	0.77
Finland	0.94	2.75	1.26	1.31	1.86	0.97
France	1.04	1.24	1.19	1.04	1.07	1.06
Germany	1.21	1.02	1.20	1.00	1.18	1.09
Greece	1.08	0.86	1.00	0.57	0.78	0.57
Ireland	0.70	0.57	0.46	1.09	0.69	1.50
Italy	1.06	1.23	1.07	1.02	0.85	0.92
Netherlands	1.41	1.57	1.00	1.06	1.11	0.99
Portugal	1.00	1.25	1.33	1.00	1.75	2.25
Spain	1.53	0.45	0.79	1.10	0.86	1.37
Sweden	1.00	1.75	0.96	0.89	1.31	0.78
UK	1.21	1.08	1.26	0.97	0.93	0.96

Panel C: **Cash flow from operations ratios vs. earnings ratios**						
Paired t-test	–7.04***	–4.92***	–5.91***	–7.24***	–3.25***	–3.75***

Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. # SmPositive CFO/#SmNegative CFO is the number of small positive to small negative CFO; a firm year observation is defined as a small CFO if scaled CFO is in the range [0 : 0.005); a firm year observation is defined as small negative CFO if scaled net CFO is in the range [–0.005 : 0). Scaled CFO is defined as follows: CFO/TA is cash flow from operations divided by opening total assets (WS #2999); CFO/MV is cash flow from operations divided by opening market value of equity (WS 'YrEndMarketCap'); CFO/SA is cash flow from operations divided by opening sales (WS #1001). WS # is the item number in the *Worldscope* database. Cash flows from operations are calculated as $CFO_t = E_t – TACC_t$, where $TACC_t = (\Delta CA_t – \Delta CASH_t) – (\Delta CL_t – \Delta STD_t – \Delta TP_t) – DEP_t – \Delta PROVISIONS_t$. Earnings and its components (CFO_t, $TACC_t$) are scaled by divided by opening sales (WS #1001), changes in earnings and its components (CFO_t, $TACC_t$) are scaled by divided by opening sales (WS #1001). Forecast errors and its compoents are scaled by opening total assets (WS #2999).

Table 8
Income smoothing

Panel A:		**Interquartile range**			**Eckel index**			**Correlation**	
Accounting regimes	*N*	*Earnings (E)*	*N*	*ΔEarnings (ΔE)*	*N*	*% of smoothers*	*% of non-smoothers*	*N*	*ρ(ΔACC, ΔCFO)*
US	79,982	0.133	79,837	0.073	11,349	73.75	26.25	51,726	–0.52
EU	61,806	0.092	62,943	0.045	7,333	85.31	14.67	39,169	–0.78
British origin	24,703	0.118	25,229	0.058	2,827	83.41	16.59	16,777	–0.68
French origin	15,900	0.096	16,159	0.041	1,993	86.10	13.90	9,129	–0.87
German origin	12,922	0.051	13,091	0.027	1,649	87.69	12.31	7,736	–0.87
Scandinavian origin	7,041	0.080	7,156	0.050	864	85.19	14.81	4,493	–0.80

Panel B:		**Interquartile range**			**Eckel index**			**Correlation**	
Matched sample	*N*	*Earnings (E)*	*N*	*ΔEarnings*	*N*	*% of smoothers*	*% of non-smoothers*	*N*	*ρ(ΔACC, ΔCFO)*
Matched US	5,548	0.076	5,566	0.048	1,307	77.58	22.42	8,211	–0.61
Matched British	5,548	0.081	5,566	0.041	1,215	84.49	15.06	8,310	–0.66
Matched other EU	5,548	0.047	5,566	0.026	1,240	86.21	13.79	6,370	–0.87

Panel C:		**Interquartile range**			**Eckel index**			**Correlation**	
EU Member States	*N*	*Earnings (E)*	*N*	*ΔEarnings*	*N*	*% of smoothers*	*% of non-smoothers*	*N*	*ρ(ΔACC, ΔCFO)*
Austria	1,214	0.057	1,225	0.036	142	89.44	10.56	622	–0.88
Belgium	1,922	0.256	1,974	0.062	222	76.13	23.87	1,034	–0.79
Denmark	2,479	0.082	2,514	0.045	284	83.45	16.55	1,497	–0.83
Finland	1,674	0.064	1,687	0.043	192	93.75	6.25	1,159	–0.86
France	9,674	0.073	9,774	0.036	1,227	86.96	13.04	5,427	–0.85
Germany	9,220	0.043	9,331	0.025	1,135	85.64	14.36	5,866	–0.85
Greece	1,517	0.150	1,548	0.068	201	90.55	9.45	929	–0.93
Ireland	810	0.092	859	0.049	96	80.21	19.79	655	–0.69
Italy	3,247	0.071	3,337	0.033	372	93.28	6.72	1,869	–0.90
Netherlands	2,752	0.075	2,786	0.028	320	85.94	14.06	1,918	–0.80
Portugal	908	0.087	933	0.044	105	85.71	14.29	630	–0.90
Spain	2,147	0.119	2,204	0.039	238	87.39	12.61	1,317	–0.88
Sweden	2,944	0.081	3,019	0.060	388	82.22	17.78	1,905	–0.73
UK	21,298	0.126	21,752	0.063	2,411	83.20	16.80	14,341	–0.66

Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. Measures detecting income smoothing are defined as: Interquartile range (Q_3–Q_1) of the empirical distributions of earnings (E) and earnings changes (ΔE) scaled by previous year's sales (WS#1001); the Eckel Index relating the variability of sales to the variability of earnings over a period of time – here, firm i is considered as an income smoother if the CV(ΔE_i) is smaller than CV($\Delta SALES_i$) over at least three following years; the Spearman coefficient of correlation between the change in total accruals and the change in cash flow from operations, both variables scaled by opening total assets.

(B2) for the groupings of British and German accounting origin are largely identical.

The ratios of small positive [0 : 0.005) to small negative [–0.005 : 0) cash flow and change in cash flow are given for each Member State in Panel B of Table 7. The ratios fluctuate around one, regardless of the deflator used. Indeed, their magnitude is much lower than the corresponding ratios of small profits to small losses given in Table 4 and of small earnings increases to small earnings decreases in Table 5. The paired t-tests reported in Panel C provide evidence that these differences are highly statistically significant, and it can be seen that the mean ratios are significantly lower for small positive to small negative cash flow and changes in cash flow than for the earnings and changes in earnings. The BD test statistics of the CFO-based ratios (unreported) are generally insignificant across the different countries and deflators used. They are never consistently significant across the deflators for any of the 14 countries we analyse. These results further validate the absence of systematic discontinuities in the distributions of (scaled) CFO and changes in CFO.

Overall, our results show that the distributions of cash flow from operations and changes in CFO do not exhibit the same discontinuities around the targets. Thus, it may be inferred that it is the accruals components of earnings which mainly cause the discontinuities in the scaled earnings distributions that were documented above. However, as we do not (attempt to) distinguish between discretionary and non-discretionary accruals components, these discontinuities could either be caused by the normal accruals process (Beaver et al., 2003a), by accruals manipulation and earnings management (Dechow et al., 2003), or by some combination of both of these.

4.2.2. Earnings targets and the smoothing of income

The question still to be answered is whether the discontinuities that we have detected around the three earnings targets are actually related to income smoothing, the form of earnings management we attempt to detect in our multi-country study. The graphical impressions and the summary statistics presented above suggest such an association between the level of smoothing and the extent to which profits targets are achieved. The high clustering of earnings and earnings changes in the class slightly above zero, and the comparatively low clustering slightly below zero would be consistent with such an explanation. In this section, we test empirically this conjecture. Table 8 reports the results for our three largely independent proxies for income smoothing and Table 9 tests their relation to meeting or beating the three benchmarks that we have analysed.

The interquartile range is the first proxy for income smoothing, and the results in Table 8 show the spread in earnings (E) and earnings changes (ΔE) scaled by sales (results for TA and MV are very similar). The interquartile range focuses on the middle 50% of the empirical distribution and adds to the evidence already reported in Tables 1 and 2, where the standard deviation described the spread of the distributions as a whole. The results in Table 8 show that both for the full samples in Panel A as well as for the matched samples in Panel B, the US earnings and earnings changes distributions are more spread than in the EU. Across the EU, the British origin grouping shows the highest values with 0.118 (0.058) for earnings (earnings changes), followed by the mixed Scandinavian grouping at 0.080 (0.050) and the plan-based grouping of French origin at 0.096 (0.041). The German origin group has the lowest interquartile range for both earnings and earnings changes at 0.051 (0.027), indicating the highest level of income smoothing activity. These results are confirmed when looking at the individual Member States in Panel C, where Austria at 0.057 (0.036), Germany at 0.043 (0.025) and Italy at 0.071 (0.033) have the lowest ranges compared to Ireland at 0.092 (0.049), the Netherlands at 0.075 (0.028) and the UK at 0.126 (0.063) which are among the highest, with the other EU Member States generally somewhere in between. The British origin group shows even wider interquartile ranges for scaled earnings compared to the US both for the matched and unmatched samples.

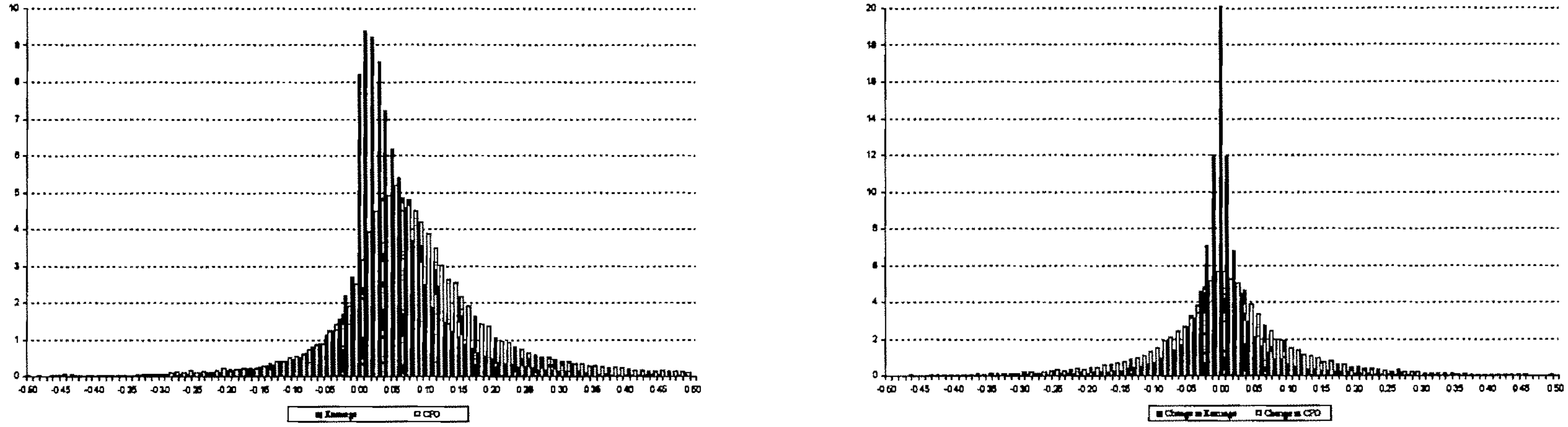
The second proxy of income smoothing in Table 8 is the Eckel Index, which classifies 85.31% of firms in the EU as income smoothers versus 73.75% of the US sample. This result also holds for the matched samples: only 77.58% of the US firms, but 84.49% of those in the UK, Ireland and Netherlands and 86.21% of firms in other Member States are classified as income smoothers. The high percentage of smoothers found here for the US is not in agreement with the much lower proportions reported in studies by Albrecht and Richardson (1990) or Michelson et al. (1995). They find only around 40% income smoothers in the US, albeit for much earlier sample periods. Although the magnitude of income smoothing in the EU is highest for the German grouping (87.69%) and lowest for the British (83.41%), the relative difference in magnitude appears to be very small, although it is worth noting that the outcomes within the EU range from 76.13% for Belgium to 93.75% for Finland, as reported in Panel C of Table 8.

Our third proxy for income smoothing is the correlation between the changes in accruals and the changes in cash flow from operations, which is negative as expected. At –0.78, the interaction is

Figure 6
Earnings versus cash flow from operations in the EU

Panel A1: Cash flow versus earnings (n=42,658)

Panel A2: Change in cash flow versus change in earnings (n=37,081)



Panel B1: Cash flow: British and German accounting origin (n=17,648; 8,495)

Panel B2: Change in cash flow: British and German accounting origin (n=15,532; 7,272)

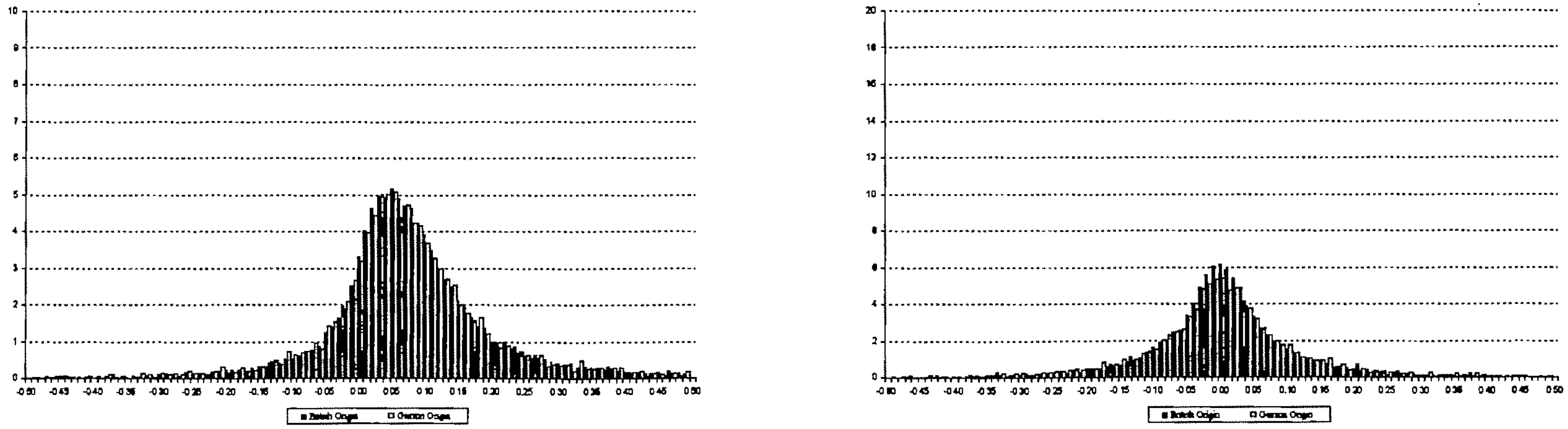


Table 9
Earnings targets and income smoothing in the EU

Panel A:	**Smoothing rank**	**Benchmark beating ranks**		
		Rank *#SmProfit/#SmLoss*	*Rank* *#SmPos ΔE/#SmNeg ΔE*	*Rank* *#SmPos FE/#SmNeg FE*
Austria	11.25	9.00	5.33	11.33
Belgium	2.25	5.17	8.33	3.67
Denmark	6.00	4.33	3.67	4.33
Finland	10.75	7.67	1.67	8.67
France	9.25	4.50	7.67	1.33
Germany	10.38	9.67	9.67	13.00
Greece	7.25	8.00	7.00	7.67
Ireland	3.50	2.00	8.33	13.00
Italy	12.13	11.00	11.33	4.33
Netherlands	8.75	13.33	13.67	8.00
Portugal	8.13	12.33	5.33	10.33
Spain	8.38	11.00	12.67	7.67
Sweden	4.50	4.67	6.33	1.67
UK	2.50	2.33	4.00	10.00

Panel B:	**Earnings targets and smoothing**		
	Ratio *#SmProfit/#SmLoss*	*Ratio* *#SmPos ΔE/#SmNeg ΔE*	*Ratio* *#SmPos FE/#SmNeg FE*
Rank correlation	0.56**	0.15	0.14
Regression coefficient	0.79***	0.19	0.14

Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. We report only test statistics for the average ratios. The results were qualitatively similar for individual ratios. The Smoothing rank is computed by averaging the ranks across all four individual smoothing scores reported for each Member State in Table 8. The Benchmark beating ranks are computed for each benchmark as the average rank of each Member State across the three ratios of earnings (Table 4, panel C), earnings changes (Table 5, panel C) and forecast errors (Table 6, panel C).

greater for the EU than for the US sample with –0.52. Within the EU, again the measure is smaller for the British grouping (–0.68) than for the German grouping (–0.87). However, the highest levels of income smoothing are in Greece (–0.93), Italy (–0.90) and Portugal (–0.90), with the lowest being indicated by this measure in Ireland (–0.69) and the UK (–0.66). Note that the rankings correspond to prior evidence, although the magnitudes of the negative correlations are generally lower than those reported in Leuz et al. (2003).

In sum, these results document higher income smoothing in the EU than in the US for each of the three proxies, as well as different levels of income smoothing across the EU Member States. The results are consistent with prior work on comparative income smoothing (see Langendijk and van Praag, 1996; Leuz et al., 2003). This earlier work did not analyse or formally test the relationship between income smoothing and benchmark beating activities which we address in Table 9.

The average rank across the three income smoothing proxies is given in Panel A of Table 9. The UK (2.50), Belgium (2.25) and Ireland (3.5) have the lowest while Italy (12.13), Austria (11.25), Finland (10.75) and Germany (10.38) have the highest average ranks. This may be compared with the average rank for each of the three earnings targets that were considered earlier, which is also reported in Table 9. It appears that the relative importance of benchmark beating among EU Member States depends much on which individual earnings target is analysed. For example, while the UK is ranked second lowest for the small profit to small loss ratio (2.33) and third lowest for the small positive earnings changes to small negative earnings changes ratio (4.00), it is among the highest for the ratio of small positive to small negative forecast errors (10.00). To the extent that these ratios capture earnings management, these results suggest not only that the opportunities for earnings management differ across jurisdictions and accounting regimes, but also that the relative incentives for achieving the one or other earnings target may differ across the Member States of the EU as well.

Finally, we test whether there is a significant statistical relation between the average smoothing rank and the three individual benchmark beating ranks at the country level across the EU Member States. The results in Panel B of Table 9 show that only the ratio of small profits to small losses is significantly positively associated with income

Table 10
Earnings targets and reporting under IAS/IFRS or US-GAAP in the EU

Panel A:	**#SmProfit / #SmLoss**			**BD test statistics**					
	E/TA	*E/MV*	*E/SA*	*E/TA*		*E/MV*		*E/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
IAS/IFRS	9.50	2.44	4.20	–5.4***	5.0***	–0.9	1.8*	–2.3**	1.5
US-GAAP	2.83	3.40	3.00	–1.1	1.8*	–2.0**	1.5	–1.4	0.9

Panel B:	**#SmPos. ΔE / #SmNeg. ΔE**			**BD test statistics**					
	ΔE/TA	*ΔE/MV*	*ΔE/SA*	*ΔE/TA*		*ΔE/MV*		*ΔE/SA*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
IAS/IFRS	1.58	1.83	1.63	–0.4	1.2	–0.4	0.7	–0.6	0.0
US-GAAP	1.27	1.38	0.80	0.3	0.8	0.3	0.4	0.8	–1.1

Panel C:	**#SmPos. FE / #SmNeg. FE**			**BD test statistics**					
	FE/P	*FE/TA*	*FE/|Act|*	*FE/P*		*FE/TA*		*FE/|Act|*	
				Down	*Up*	*Down*	*Up*	*Down*	*Up*
IAS/IFRS	1.11	1.57	2.50	1.9*	0.0	–5.4***	5.9***	–5.2***	2.5***
US-GAAP	1.71	2.75	3.00	0.0	6.0***	–13.0***	9.1***	–6.1***	8.7***

Notes: ***, **, * Significantly different from zero at significance levels of 0.01, 0.05, and 0.10, two-tailed tests. #SmProfit/#SmLoss is the number of small profits to small losses; a firm year observation is defined as a small profit if scaled net earnings are in the range [0 : 0.005); a firm year observation is defined as small loss if scaled net earnings are in the range [–0.005 : 0). Scaled net earnings are as follows: E/TA is net income (WS #1651) divided by opening total assets (WS #2999); E/MV is net income (WS #1651) divided by opening market value of equity (WS 'YrEndMarketCap') and E/SA is net income (WS #1651) divided by opening sales (WS #1001). WS # is the item number in the *Worldscope* database. BD test statistics measure the level of significance of a discontinuity around an earnings target area.

smoothing. The Spearman correlation coefficient between the two variables is 0.56, which is significant at the 5% level, and the corresponding coefficient in the OLS-regression is 0.79, which is significant at the 1% level. However, the other two earnings targets – an increase in earnings and a positive earnings surprise – are statistically unrelated to our aggregate income smoothing score, even though the regression coefficients and the Spearman correlations have positive signs. These insignificant results could be driven by the low power of our country-level aggregate scores. Taken at face value, our results suggest that income smoothing firms are particularly concerned about reporting profits (regression coefficient 0.79), but less so about increasing their earnings relative to the last fiscal year (0.1) or the achievement of analysts' earnings forecasts (0.14).

4.3. Earnings targets in the EU under IAS/IFRS or US-GAAP

In this section, we present some early evidence on the properties of earnings around specific targets for those firms in the EU that have started to report their financial results under some form of 'internationally recognised' accounting standards (IAS/IFRS or US-GAAP) prior to the EU policy requiring IFRS adoption by listed companies.

In Panel A of Table 10, the magnitude of the ratio of small positive to small negative earnings (in the range from 2.44 to 9.50) suggests that reporting a profit remains an important target under international standards. The relative ranking between IAS/IFRS and US-GAAP depends much on the scaling variable used, however. This is not the case for the earnings changes target. The ratio of small earnings increases to small earnings decreases under international standards; that is to say, the ratios in Panel B of Table 10 are lower than the corresponding ratios reported earlier in Table 5 under local GAAP, particularly for those firms adopting US-GAAP. Also, all BD test statistics are insignificant. It appears that achieving last year's financial results is less important as a benchmark under internationally recognised standards.

Instead, more importance seems to be assigned to meeting analysts' consensus earnings forecasts. The ratio of small positive to small negative surprises is well above one and in most cases statistically significant under the BD test (Table 10, Panel C). Given that the European international GAAP adopters are generally regarded as particularly oriented towards the capital market (Cuijpers and Buijink 2005), it is not a surprising result to find that achieving analysts' earnings forecasts is an important goal for IAS/IFRS and US-GAAP adopters alike.

Overall, this analysis of early European IAS/IFRS and US-GAAP adopters, covering the years running up to the wholesale reporting regime changes within the EU that are now under way, shows that benchmark beating around several important earnings targets continues to be important. It is beyond the scope of this paper to extend this assessment, and we leave a more thorough analysis of the properties of earnings in the EU under mandatory IFRS-adoption to future research.

5. Conclusions

For a large sample of firms from the European Union, we find that more firms than expected (i) report small positive earnings, (ii) report small positive earnings increases and (iii) have zero or small positive forecast errors. Our results are comparable to prior research in the US and UK, but extend the existing evidence internationally and document discontinuities that are far more pronounced in the EU as a whole than in the UK and the US, and particularly so in those jurisdictions that do not have a long history of professionally based standard setting.

This paper contributes accordingly to the ongoing discussion surrounding the impact of different GAAP regimes and institutional environments on the properties of accounting earnings. Our findings illustrate how significant the differences have been to date within the EU – despite the various efforts at accounting harmonisation by the European Commission. They are of further interest in the light of the recent steps taken in the EU towards accounting standardisation through the general requirement for listed companies to apply IFRS from 2005 onwards. As it is not clear whether the observed dissimilarities across EU Member States are due to residual differences in the accounting rules and regulations in place during the test period or due to diverging reporting incentives in the jurisdictions and market segments involved, which may themselves be evened out as a result of further integration or may perhaps remain unchanged after the planned introduction of IFRS, the quality of the transitional financial statements that are being prepared by firms in the EU at the time of writing remains an interesting and open question.

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An empirical assessment of the Feltham-Ohlson models considering the sign of abnormal earnings

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Abstract—This paper provides an empirical assessment of the Feltham-Ohlson models, distinguishing between firms with positive and negative abnormal earnings. Abnormal earnings persistence and conservatism parameters differ for these two groups; this implies different earnings prediction models and valuation functions for both profit-making and loss-making firms. The analysis refers to the period 1991–1999 and uses a sample of Spanish firms quoted on the Madrid S.E. The results suggest that our contextual approach is more useful than the non-contextual one to predict future abnormal earnings and explain current prices. Although the Ohlson (1995) model is accurate in forecasting future abnormal earnings and stock prices, the results improve when firms with negative abnormal earnings are valued using a temporary model and firms with positive abnormal earnings using a more permanent one. The Feltham and Ohlson (1995) model generates the lowest forecast errors in the prediction of positive abnormal earnings, but it produces the least accurate results in forecasting prices.

1. Introduction

The Ohlson (1995) and Feltham and Ohlson (1995) studies (OFO models hereafter) have become the main reference in market-based accounting research. These papers follow the traditional stream of accounting valuation studies, where the value of the firm is the accounting book value plus the present value of the expected future residual income (Preinrich, 1938; Edwards and Bell, 1961, Peasnell, 1982). In our view, the main contribution of the OFO models has been to provide a solid theoretical framework for stock valuation based on the fundamental accounting variables: earnings and book value. In addition, these models allow for any other information which could be relevant to predict these figures and value the firm. However, the results of previous studies that assess such models do not confirm their usefulness to predict market prices. The evidence shows that the implied values are lower than market prices, in other words OFO models undervalue the value of the firm relative to market prices.

The main purpose of this paper is to provide additional evidence about the adequacy of these models by using a contextual approach that takes into account the sign of abnormal earnings. To this end, we consider different earnings persistence and conservatism parameters in the linear information models (LIM hereafter) for firms with positive and negative abnormal earnings. Our empirical results show that companies with abnormal losses will be better valued using transitory models, while companies with abnormal profits will be better measured using more permanent models. To achieve our objective we consider two different aspects: first, we take into account the ability of the contextual LIMs to predict future abnormal losses and profits, and second, we analyse the ability of the contextual approach to explain market prices. Our results suggest that investors perceive positive and negative abnormal earnings differently.

The paper is structured as follows: in Section 2 we consider the theoretical background of the OFO models and provide a summary of the related previous research. Section 3 is devoted to the research design, the variables and the sample used in this research. Section 4 describes the results of the empirical analysis. Finally, Section 5 summarises the main conclusions of our study.

2. Theoretical background and previous literature

2.1. Development of basic models

The basis of the Ohlson (1995) model is the traditional dividend discounting model. This model

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can be easily transformed into the known *residual income valuation* model (RIV hereafter) introducing two conditions: i) the accounting system follows the *clean surplus relation*, i.e., all changes in book value are reported as either income or dividends (net of capital contributions), and ii) the abnormal earnings (x_t^a) are defined as the excess of accounting earnings over the normal earnings that could be obtained by opening equity ($x_t^a = x_t - r \cdot bv_{t-1}$). In RIV the value of the firm's equity equals the book value of equity plus the present value of expected abnormal earnings:

$$V_t = bv_t + \sum_{\tau=1}^{\infty} \frac{E_t\left[x_{t+\tau}^a\right]}{(1+r)^{\tau}} \tag{1}$$

where: V_t: market value of the firm's equity at time t
bv_t: book value of equity at time t
$x_{t+\tau}^a$: abnormal earnings of year t+τ ($\tau \geq 1$)
r: discount rate or cost of equity capital

Future expectations cannot be observed and the OFO models solve this problem assuming that existing information follows a linear Markovian structure. This produces a closed valuation formulae, in which value depends solely on known accounting variables plus the 'other information' variable. In particular the Ohlson (1995) linear valuation function is:

$$V_t = bv_t + \alpha_1 x_t^a + \alpha_2 v_{1t} \tag{2}$$

where:

$$\alpha_1 = \frac{\omega_{11}}{1+r-\omega_{11}}\,;\quad \alpha_2 = \frac{1+r}{(1+r-\omega_{11})(1+r-\gamma_1)}$$

v_{1t}: 'other information' variable at time t
ω_{11}: persistence of the abnormal earnings ($0 < \omega_{11} < 1$)
γ_1: persistence of the 'other information' ($0 < \gamma_1 < 1$)

Feltham and Ohlson (1995) take a further step and consider the accounting conservatism that affects operating assets. As in Myers (1999), Lo and Lys (2000) and Ota (2002), we assume there are no other assets, consequently the related valuation function becomes:

$$V_t = bv_t + \alpha_1 x_t^a + \alpha_2 bv_t + \beta_1 v_{1t} + \beta_2 v_{2t}, \tag{3}$$

where:

$$\alpha_1 = \frac{\omega_{11}}{1+r-\omega_{11}}\,,\quad \alpha_2 = \frac{(1+r)\omega_{12}}{(1+r-\omega_{11})(1+r-\omega_{22})}$$

$$\beta_1 = \frac{1+r}{(1+r-\omega_{11})(1+r-\gamma_1)}\,,\quad \beta_2 = \frac{(1+r)\omega_{12}}{(1+r-\omega_{11})(1+r-\omega_{22})(1+r-\gamma_2)}$$

v_{1t} and v_{2t}: 'other information' variables at time t
ω_{11}: persistence of abnormal earnings ($0 < \omega_{11} < 1$)
ω_{12}: conservatism parameter ($\omega_{12} > 0$)
ω_{22}: growth in the book value of equity parameter ($1 < \omega_{22} < 1 + r$)
γ_1 and γ_2: persistences of the 'other information' variables ($0 < \gamma_1, \gamma_2 < 1$)

2.2. *Previous empirical literature*

Table 1 summarises the main features of the previous empirical literature that has verified the adequacy of the OFO models. Most of the literature refers to the USA, with the exception of McCrae and Nilsson (2001), Ota (2002) and Giner and Iñiguez (2006) that consider the Swedish, Japanese and Spanish markets respectively. Generally, the papers first analyse the ability of the models to predict future abnormal earnings (*predictive link*), and then estimate the intrinsic value of the firm (*valuation link*) using the related valuation functions. Regarding the methodology used, there is no a clear preference for a time-series nor a pooled time-series cross-sectional regression, and only Stober (1996) employs both methodologies. As for the first 'other information' variable (v_{1t}) only some papers include it in the analysis, and, with the exception of Giner and Iñiguez (2006), none of them takes the second 'other information' variable (v_{2t}) in (3) into account.

Regarding the *predictive link*, the estimated parameters of the LIMs are reported in Table 2 and provide evidence of the adequacy of the Ohlson (1995) LIM. These are indeed within theoretical limits and the auto-regressive process with one year lag provides a reasonable empirical approximation (Dechow et al. 1999, Callen and Morel 2001, Ota 2002). However, the evidence regarding the Feltham and Ohlson (1995) LIM is contrary to their model. The conservatism parameter is always negative, and this suggests aggressive accounting, which is contrary to our knowledge of accounting practices and rules worldwide. Special attention should be paid to Giner and Iñiguez (2006), who analyse both LIMs in the Spanish stock market, considering all the variables included in the OFO framework and using different alternative assumptions about the parameters. Their results are similar to those obtained in the previous literature. The Ohlson (1995) model, which uses intermediate persistence and includes the 'other information' variable measured using analysts' forecasts of earnings as Ohlson (2001) suggests, produces the lowest abnormal earnings forecast errors.

Regarding the *valuation link*, the OFO models systematically undervalue stock prices in all markets under analysis. Nevertheless, the results of Giner and Iñiguez (2006) show that the models based on Ohlson (1995) explain stock prices better than those based on Feltham and Ohlson (1995), since they have lower bias and higher accuracy. Thus, the Ohlson model which considers the 'other information' variable provides the most accurate results.

Table 1
Literature review: main characteristics

Study	*Model*	*Country*	*Sample*	*Link*	*'Other information'*	*Methodology*
Stober [1996]	Feltham and Ohlson [1995]	USA	1964–1993	Predictive	Ignored	Time-series and Cross sectional
Bauman [1999]	Feltham and Ohlson [1995]	USA	1980–1994	Predictive	Ignored	Time-series
Myers [1999]	Feltham and Ohlson [1995]	USA	1975–1996	Predictive and valuation	Order backlog	Time-series
Dechow, Hutton and Sloan [1999]	Ohlson [1995]	USA	1976–1995	Predictive and valuation	Based on analysts' forecasts	Cross-sectional
McCrae and Nilsson [2001]	Ohlson [1995]	Sweden	1987–1997	Predictive and valuation	Based on analysts' forecasts	Cross-sectional
Choi, O'Hanlon and Pope [2001]	Ohlson [1995]	USA	1976–1995	Predictive and valuation	Based on analysts' forecasts	Cross-sectional
Callen and Morel [2001]	Ohlson [1995]	USA	1969–1996	Predictive and valuation	Ignored	Time-series
Ota [2002]	Ohlson [1995]	Japan	1964–1998	Predictive and valuation	Ignored but adjusted	Time-series
Giner and Iñiguez [2006]	Ohlson [1995] Feltham and Ohlson [1995]	Spain	1992–1999	Predictive and valuation	Based on analysts' forecasts and the economy growth	Cross-sectional

Table 2
Literature review: coefficients of the OFO models

ω_{11}: persistence of abnormal earnings; ω_{12}: conservatism parameter; ω_{22}: growth in book value of equity parameter; γ_1: persistence of the first 'other information' variable; γ_2: persistence of the second 'other information' variable.

STUDY	ω_{11}	ω_{12}	ω_{22}	γ_1	γ_2
Theoretical interval in the OFO models	$0 \leq \omega_{11} \leq 1$	$\boldsymbol{\omega_{12} > 0}$	$0 \leq \omega_{22} \leq 1+r$	$0 \leq \gamma_1 \leq 1$	$0 \leq \gamma_2 \leq 1$
Stober [1996]	0.395	Between –0.014 and –0.025	Between 0.94 and 0.95	–	–
Bauman [1999]	0.223	–0.052	0.911	–	–
Myers [1999]	0.036	–0.005	1.061	0.998	–
Dechow. Hutton and Sloan [1999]	Between 0.47* and 0.62*	–0.09*	–	0.32*	–
McCrae and Nilsson [2001]	0.523*	–	–	0.436*	–
Choi, O'Hanlon and Pope [2001]	Between 0.58* and 0.61*	–	Between 1 and 1.06	Between 0.59 and 0.60	–
Callen and Morel [2001]	0.462*	–	–	–	–
Ota [2002]	Between 0.52* and 0.73*	–0.03	–	–	–
Giner and Iñiguez [2006]	Between 0.55* and 0.84*	Between –0.091* and 0.003	Between 1.014* and 1.026*	Between 0.34* and 0.42*	Between 0.38* and 0.90*

(–) means that the parameter is ignored
*Significant at 5% (Stober [1996], Bauman [1999] and Myers [1999] do not indicate the significance)

3. Research design

We evaluate the empirical implications of six contextual models based on the OFO framework, and compare them with non-contextual models as well as with two other accounting-based models, which can be considered as restricted versions of Ohlson (1995). The OFO models consider the persistence of abnormal earnings, the influence of accounting conservatism and the impact of additional information that has not yet affected abnormal earnings. Our contextual models consider an additional dimension: firm performance. We argue that OFO models can only be used to value firms with abnormal profits; due to the effect of the persistence parameter if used for firms with abnormal losses, the computed intrinsic values would be lower than the book value of equity (or would even be negative).

To avoid such an outcome, two possible alternatives could be considered: i) abnormal earnings are perceived by investors as transitory, or ii) the firm is valued under the liquidation option. In the first case, it is argued that although the firm has obtained negative abnormal earnings, they will eventually revert to being positive, or will at least be zero. However, this cannot be captured through the Markovian process of the OFO models, because the persistence parameter ought to be negative; and from an economic perspective it is not reasonable to think that a firm can obtain positive abnormal earnings in even years and negative ones in odd ones. However, a purely transitory model can take this into account (ω_{11}=0). The second alternative is also possible within the LIM framework (if ω_{11}=0 then V_t=bv_t), because the book value of equity is the surrogate of the liquidation option. This is consistent with Hayn (1995) and Collins et al. (1999), who show that investors have different perceptions about negative and positive earnings. These papers conclude that the book value of equity is used as a proxy of the value of loss-making firms in general, and as a proxy for the abandonment option for those firms most likely to cease their operations and liquidate. Similarly Berger et al. (1996) and Burgstahler and Dichev (1997) show that firms have a minimum value, the liquidation, adaptation or abandonment value, which can be surrogated by the book value of equity. Therefore, we assume that the persistence of negative abnormal earnings should be zero, or at least lower than the persistence of positive abnormal earnings.

In this research we estimate different LIM parameters taking into account the sign of abnormal earnings; it is argued that firms with negative abnormal earnings will have an earnings persistence close to zero (ω_{11}=0). We estimate different abnormal earnings persistence parameters by introducing a dummy variable D_t that takes the value 1 if the firm has positive abnormal earnings at time t, and 0 otherwise. Next, we refer to the alternative abnormal earnings expectation models and the related valuation functions, and conclude this section with a description of the sample and the variables used in the empirical analysis.[1]

3.1. Forecasting abnormal earnings and intrinsic values

Contextual Ohlson (1995) model

$$x^a_{t+1} = \omega_{11} x^a_t + \omega^+_{11} D_t x^a_t + \nu_{1t} + \varepsilon_{1t+1} \qquad (4)$$

$$\nu_{1t+1} = \gamma_1 \nu_{1t} + \varepsilon_{2t+1}$$

where: ω_{11}: persistence of negative abnormal earnings (cases with D_t=0)
$\omega_{11}+\omega^+_{11}$: persistence of positive abnormal earnings (cases with D_t=1)
γ_1: persistence of the 'other information' variable

We have not included the dummy variable in the second equation. In Ohlson framework, abnormal current earnings, either positive or negative, do not predict relevant events, nor can they affect their persistence. In other words, a firm could have low or even negative abnormal profitability, and at the same time there could be some additional information that suggests an improvement or a worsening of the expectations about future abnormal earnings.

The 'other information' variable has been measured following the suggestion of Ohlson (2001). It assumes that analysts use all available information to make their predictions about future earnings; therefore the 'other information' is the difference between their forecasts of abnormal earnings[2] and the expectations based on an historical series of abnormal earnings which consider the sign of current profitability:

$$\nu_{1t} = E_t[x^a_{t+1}] - (\omega_{11} + \omega^+_{11} D_t)\, x^a_t \qquad (5)$$

$$\nu_{1t} = f^{at+1}_t - (\omega_{11} + \omega^+_{11} D_t)\, x^a_t$$

Note that expected abnormal earnings in t+1 are: $E_t[x^a_{t+1}] = (\omega_{11}+\omega^+_{11}D_t)\, x^a_t + \nu_{1t} = f^{at+1}_t$, and so do not depend on the sign of current abnormal earnings, but on the consensus of analysts' forecasts for the next period. In other words, a firm can have current abnormal losses, but if all available information points to abnormal profits being expected they should not be considered as transitory; on the contrary they should be treated as permanent. Likewise, expected abnormal losses should be seen as low persistent even if the firm currently has abnormal profits. Consequently, the dummy variable used to forecast earnings beyond t+1 and value the firm refers to the expected profitability and not to the current one. As a result, for period t+1 instead of D_t we use the expectation for D_{t+1}: $E_t[D_{t+1}]=1$ if $f_t^{at+1}>0$, and $E_t[D_{t+1}]=0$ if $f_t^{at+1}<0$. However, as long as the dummy variable is allowed to vary over time, a switch in the sign of expected abnormal earnings after t+1 is mathematically possible, although it is economically unlikely.[3] If this happens, a closed valuation formula cannot be obtained, though abnormal earnings can still be calculated and used to value the firm. To predict abnormal earnings for period $t+\tau$, we observe the sign of previous period expected abnormal earnings ($E_t[x^a_{t+\tau-1}]$) and apply the persistence of profitable firms if positive, but the persistence of loss-making firms if this expectation is negative. Therefore in this computation we transform the random variable into an observed one. We forecast abnormal earnings recursively (extended over additional years until they converge to zero) and then we compute intrinsic values as the current book value plus the discounted value of expected abnormal earnings. Therefore:

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[1] In most of the previous studies, intercepts are included in order to capture the average effect of any omitted variable. However, Choi et al. (2001: 17) conclude 'the intercept-inclusive approach does not appear to improve the overall accuracy of valuation estimates'. Taking this into account and considering that the OFO models do not add intercepts, we have not included them in this study.

[2] Analysts produce earnings forecasts, $E_t[x_{t+1}] = f^{t+1}_t$; thus in order to calculate abnormal earnings forecasts we compute: $E_t[x^a_{t+1}] = E_t[x_{t+1} - r{\cdot}bv_t] = f^{t+1}_t - r{\cdot}bv_t = f^{at+1}_t$.

$$E_t[x^a_{t+\tau}]=(\omega_{11}E_t[x^a_{t+\tau-1}]+\omega^+_{11}E_t[D_{t+\tau-1}]E_t[x^a_{t+\tau-1}])$$
$$+E_t[v_{1t+\tau-1}]$$

where:

$$E_t[v_{1t+\tau}]=\gamma_1E_t[v_{1t+\tau-1}]=\gamma_1^\tau v_t$$
$$E_t[D_{t+\tau-1}]=0 \text{ if } E_t[x^a_{t+\tau-1}]<0$$
$$E_t[D_{t+\tau-1}]=1 \text{ if } E_t[x^a_{t+\tau-1}]>0$$

and

$$V_t=bv_t+\sum_{\tau=1}^{T}\frac{E_t\left[x^a_{t+\tau}\right]}{(1+r)^\tau},$$

where T is 1,000 years.

It should be noted that this approach is only an approximation for the correct expectation model. As the dummy variable and the expected abnormal earnings are random, the expectation of future abnormal earnings should include a covariance term. In fact $E_t[D_{t+\tau-1}x^a_{t+\tau-1}]=E_t[D_{t+\tau-1}]E_t[x^a_{t+\tau-1}]+COV_t[D_{t+\tau-1}x^a_{t+\tau-1}]$, but in the previous computation we have ignored the last term. We are conscious that the correlation between both variables could be positive, so that the results could be biased, but from an empirical point of view to obtain the covariance between a discrete variable and a continuous one is very problematic. Consequently although the solution adopted in this paper is theoretically flawed, it can be seen as a heuristic approximation that considers expected abnormal earnings as observed data instead of random variables. In addition, we expect this covariance term to be relatively small in comparison with the other variables, so its omission should not have an important impact on our results and the above is an accurate description that capture the spirit of our version of the Ohlson model represented by equation (4).

When, as normally happens, there is no switch in the sign of expected abnormal earnings beyond t+1, then $E_t[D_{t+\tau}]=Et[D_{t+1}]$, and the previous valuation formula is equal to the one in Ohlson (1995), with the exception that we use different persistence parameters according to the sign of expected abnormal earnings for period t+1 ($\omega_{11}+\omega^+_{11}$ if $E_t[D_{t+1}]=1$ or ω_{11} if $E_t[D_{t+1}]=0$).

In addition to this general contextual model (model 4), we also consider three other models that are restricted versions. Model 1 ignores the 'other information' variable and employs a transitory (permanent) model if the firm has abnormal losses (gains). Therefore, if current abnormal earnings are negative (D_t=0), future abnormal earnings will be zero $E_t[x^a_{t+\tau}]$ and $V_t=bv_t$, but if current abnormal earnings are positive (D_t=1), they will remain indefinitely $E_t[x^a_{t+\tau}]=x^a_t$, and $V_t=bv_t+\frac{x^a_t}{r}$.

Model 2 also ignores the 'other information' but considers different intermediate persistence parameters for firms with abnormal profits or losses.

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[3] We thank an anonymous referee for pointing out the possibility of sign switches. In the procedure proposed above, expected abnormal earnings in t+2 are: $E_t[x^a_{t+2}]=(\omega_{11}E_t[x^a_{t+1}]+\omega^+_{11}E_t[D_{t+1}]E_t[x^a_{t+1}])+E_t[v_{1t+1}]$. Replacing $E_t[x^a_{t+1}]=f_t^{a,t+1}$, $E_t[v_{t+1}]=\gamma_1v_{1t}$, $v_{1t}=f_t^{a,t+1}-(\omega_{11}+\omega^+_{11}D_t)x^a_t$, we obtain different expressions depending on the sign of future abnormal earnings forecasts:

- If $f_t^{a,t+1}>0\rightarrow E_t[x^a_{t+2}]=(\omega_{11}+\omega^+_{11})f_t^{a,t+1}+\gamma_1(f_t^{a,t+1}-(\omega_{11}+\omega^+_{11}D_t)x^a_t)$

There will be a switch in the sign of expected abnormal earnings ($E_t[x^a_{t+2}]<0$) if

$$f_t^{a,t+1}<\frac{\gamma_1(\omega_{11}+\omega^+_{11}D_t)}{(\omega_{11}+\omega^+_{11}+\gamma_1)}x^a_t$$

- If $f_t^{a,t+1}<0\rightarrow E_t[x^a_{t+2}]=(\omega_{11}+\gamma_1)f_t^{a,t+1}-\gamma_1(\omega_{11}+\omega^+_{11}D_t)x^a_t$

There will be a switch in the sign of expected abnormal earnings ($E_t[x^a_{t+2}]>0$), if

$$f_t^{a,t+1}>\frac{\gamma_1(\omega_{11}+\omega^+_{11}D_t)}{(\omega_{11}+\gamma_1)}x^a_t$$

To illustrate the unlikelihood of these situations, one can use parameters obtained in previous research and use the same persistence for abnormal profits and losses (for instance, $\omega=0.6$ and $\gamma=0.3$). In that case the sign would switch if $f_t^{a,t+1}<0.2\cdot x^a_t$, thus, only if a large decline in positive abnormal earnings or a large decrease of abnormal losses is expected. In these cases, the 'other information' variable plays an important role in the LIM, and its influence in future periods will depend on its persistence.

Thus, for firms with current positive abnormal earnings ($D_t=1$) we use: $\omega_{11}+\omega_{11}^{+}$, and for remaining firms ($D_t=0$) we employ ω_{11}, the absence of analysts' forecasts precludes the possibility of changes in the sign of expected abnormal earnings[4]:

$$E_t[x^a{}_{t+\tau}]=(\omega_{11}+\omega_{11}^{+}D_t)^{\tau}x_t^a;\ V_t=bv_t+a_1x_t^a;\text{ where}$$

$$\alpha_1=\frac{(\omega_{11}+\omega_{11}^{+}D_t)}{1+r-(\omega_{11}+\omega_{11}^{+}D_t)}$$

Model 3 includes the 'other information' variable, and similar to model 1 also employs the transitory model with persistence parameters $\omega=\gamma=0$ if the firm has abnormal losses, and the permanent one with $\omega=1$ and $\gamma=0$; or $\omega=0$ and $\gamma=1$ if the firm has abnormal profits. When both parameters are zero, next period earnings coincide with analysts' forecasts but are zero afterwards: $E_t[x_{t+1}^a]=f_t^{a,t+1}$ and the intrinsic value is computed as: $V_t=bv_t+f_t^{a,t+1}/(1+r)$. When one of the parameters is zero and the other is one, the intrinsic value is: $V_t=bv_t+f_t^{a,t+1}/r$, that is, analysts' forecasts persist indefinitely: $E_t[x_{t+\tau}^a]=f_t^{a,t+1}$.

Contextual Feltham and Ohlson (1995) model

$$\begin{aligned}x_{t+1}^a&=\omega_{11}x_t^a+\omega_{11}^{+}D_tx_t^a+\omega_{12}bv_t+\omega_{12}^{+}D_tbv_t\\&\quad+v_{1t}+\varepsilon_{1t+1}\end{aligned}\tag{6}$$

$$bv_{t+1}=\omega_{22}bv_t+v_{2t}+\varepsilon_{2t+1}$$

$$v_{1t+1}=\gamma_1v_{1t}+\varepsilon_{3t+1}$$

$$v_{2t+1}=\gamma_2v_{1t}+\varepsilon_{4t+1}$$

where the new parameters are:

ω_{12}: conservatism parameter of cases with $D_t=0$
$\omega_{12}+\omega_{12}^{+}$: conservatism parameter of cases with $D_t=1$
γ_2: persistence of the second 'other information' variable

The dummy variable not only interacts with abnormal earnings, but also with the book value of equity, as it is assumed that conservatism affects the earnings level as well as the book value of equity. As for the 'other information' variables, the first one that appears in both LIMs, influences future abnormal earnings and as previously indicated has been measured following Ohlson (2001)'s suggestion:

$$\begin{aligned}v_{1t}&=E_t[x_{t+1}^a]-(\omega_{11}+\omega_{11}^{+}D_t)x_t^a\\&-(\omega_{12}+\omega_{12}^{+}D_t)bv_t=f_t^{a,t+1}-(\omega_{11}+\omega_{11}^{+}D_t)x_t^a\\&-(\omega_{12}+\omega_{12}^{+}D_t)bv_t\end{aligned}\tag{7}$$

The second 'other information' variable that influences future book value could be measured in a similar way, as the difference between the expected book value of equity based on all available information and the expectation based on the growth parameter:

$$v_{2t}=E_t[bv_{t+1}]-\omega_{22}bv_t\tag{8}$$

In this model 6, the procedure used to predict abnormal earnings and compute the intrinsic value is identical to the one explained for model 4:

$$\begin{aligned}E_t[x_{t+\tau}^a]&=\omega_{11}E_t[x_{t+\tau-1}^a]+\omega_{11}^{+}E_t[D_{t+\tau-1}]\,E_t[x_{t+\tau-1}^a]\\&+\omega_{12}E_t[bv_{t+\tau-1}]+\omega_{12}^{+}E_t[D_{t+\tau-1}]\,E_t[bv_{t+\tau-1}]\\&+E_t[v_{1t+\tau-1}]\end{aligned}$$

where:

$$E_t[v_{1t+\tau}]=\gamma_1E_t[v_{1t+\tau-1}]=\gamma_1^{\tau}v_{1t}$$

$$E_t[bv_{t+\tau}]=\omega_{22}E_t[bv_{t+\tau-1}]+E_t[v_{2t+\tau-1}]$$

$$E_t[v_{2t+\tau}]=\gamma_2E_t[v_{2t+\tau-1}]=\gamma_2^{\tau}v_{2t}$$

$$E_t[D_{t+\tau-1}]=0\text{ if }E_t[x_{t+\tau}^a-1]<0$$

$$E_t[D_{t+\tau-1}]=1\text{ if }E_t[x_{t+\tau-1}^a]>0$$

and

$$V_t=bv_t+\sum_{\tau=1}^{T}\frac{E_t\left[x_{t+\tau}^a\right]}{(1+r)^{\tau}}$$

where T is 1,000 years.

If the sign of expected abnormal earnings does not change in time, the intrinsic value will be identical to the one obtained using Feltham and Ohlson (1995) 's closed valuation formula but with different parameters for profit and loss firms, see equation (3) above.

Finally, we also consider model 5, which is a restricted case of model 6 but only includes the first 'other information' variable ($v_{2t}=0$ and $E_t[v_{2t+\tau}]=0$ in the expressions above). This model could also be considered as an extension of model 4, when conservatism is taken into account.

3.2. Measurement of data and variables

The empirical analysis uses data from three different sources. Historical accounting data are obtained from the Spanish National Securities Market Commission (CNMV-*Comisión Nacional del Mercado de Valores*). In particular, we use book value of equity and total earnings,[5] as this is the only earnings measure that can satisfy the

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[4] When the 'other information' is ignored, $E_t[D_{t+\tau}]$ is always equal to D_t as the information model is linear and abnormal earnings persist at a positive rate ω. Hence a firm with current positive (negative) abnormal earnings is expected to have future positive (negative) abnormal earnings, and only in the long term will they be zero.

[5] Some studies, such as Dechow et al. (1999), have excluded extraordinary earnings due to its transitory nature, but as Lo and Lys (2000) point out this could bias the coefficients and affect the intrinsic values.

Table 3
Sample selection procedure

Sample period: 1991–1999	*Firm/year*
Abnormal earnings:	
124 firms with available data for the 9 year period	1116
– Missing accounting data in 1991–1999	–179
– Missing market data necessary for estimating betas in 1987–99	–65
– Firm/year observations for which book value is negative	–18
– Extreme abnormal earnings observations	–20
Total firm/year observations in 1991–1999	**834**
Computed Intrinsic Values in 1993–1999:	
– Abnormal earnings of years 1991 and 1992 (estimation period)	–182
– Missing analysts' forecasts data	–49
Total estimated values in 1993–1999	**603**

clean surplus relation.[6] Stock return data are obtained from the monthly information provided by the Madrid Stock Exchange and are adjusted for subscription rights, stock splits and dividends. Analysts' forecasts are obtained from I/B/E/S (International Broker Estimate System). To avoid scale problems,[7] all variables are deflated by previous year-end book value; an advantage of using this deflator is that it refers to abnormal profitability, and thus the economic nature of the LIM remains unaltered.

To estimate abnormal earnings we first obtain the cost of capital (r) for each company based on the CAPM model.[8] In consistency with the earnings figure, we measure the cost of capital after taxes: $r_{jt} = (1 - tax_t).[rf_t + \beta_{jt}(Rmkt - rf)_t]$ where:

tax_t : effective rate of tax profit in year t[9]
rf_t : risk free rate in year t[10]
β_j : systematic risk of firm j[11]
$(Rmkt - rf)_t$: risk premium in year t[12]

Our initial sample includes 170 firms. As in most of the other studies we exclude 38 financial and insurance firms due to the different meaning of some accounting variables; another eight firms are excluded as we do not have analysts' forecasts. Therefore, our final sample contains 124 firms belonging to different industries, although there is a predominance of manufacturing companies (33%). The fundamental variable in our analysis is abnormal earnings, and because of the lack of accounting information or market data for some years, we omit 244 cases (about 22% of potential firm/year observations). Another 18 cases with negative book value are also ignored. Thus, we calculate 854 abnormal earnings, and after eliminating 2% of the most extreme observations, 834 cases remain; this allows us to estimate 603 intrinsic values for each model for the period 1993–1999. Table 3 summarises the sample selection procedure followed in this study.

The LIM parameters are estimated separately for each fiscal year. Regarding the contextual Ohlson model, ω_{11} and $\omega_{11}+\omega^{+}_{11}$ are the first order autoregressive coefficients for the negative abnormal earnings and the positive ones respectively. As negative abnormal earnings are more transitory than the positive ones, we expect ω_{11} to be positive but close to zero, while $\omega_{11}+\omega^{+}_{11}$ should be close to one (e.g. ω^{+}_{11} should be positive and statistically significant). They are estimated using all historically available data from 1991 up to the forecast year in a pooled time-series cross-sectional regression. γ_1 is the first order autoregressive coefficient

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[6] We are conscious that under the Spanish accounting rules there are few transactions that do not satisfy this condition; however the findings by Giner and Reverte (2006) suggest they would not affect the results of the study.

[7] Brown et al. (1999); Barth and Kallapur (1996); Easton and Sommers (2003), Barth and Clinch (1999) and Lo and Lys (2000) provide very interesting discussions on the problems of and solutions to the scale effect.

[8] Previous studies have adopted different approaches to estimate the cost of capital. Some use a common constant rate (Bernard, 1995; Dechow et al., 1999; Biddle et al., 2001), others use a common rate for all firms in the sample, which differs between years (Stober, 1996; Ahmed et al., 2000; Choi et al., 2001), and others employ a different rate for each firm and year (Myers, 1999; Ota, 2002).

[9] It was computed each year as the median of the ratio: tax profit/profit before taxes for all firms in the sample.

[10] We employed the average monthly rate of the *repos* over Treasury Bonds, and used the historic series published by the Bank of Spain (see http://www.bde.es/)

[11] Following Bartholdy and Peare (2001), we estimated firm betas using a 60-month window before the closing date of every annual period and required a minimum of 24 consecutive data. The market rate of return was calculated using the equally weighted average of all monthly stock returns.

[12] We used a 6% rate, suggested by Kaplan and Ruback (1995), and similar to that used in other studies, such as Sougiannis and Yaekura (2001); Courteau et al. (2001) and Easton et al. (2002).

Table 4
Descriptive statistics (accounting data in €m)

	N	*Mean*	*Median*	*Minimum*	*Maximum*	*Skewness*	*Kurtosis*
Abnormal earnings ($x_{j,t}^a$)	834	5.76	−1.28	−768.64	837.12	2.21	29.31
Earnings ($x_{j,t}$)	834	58.72	15.14	−659.57	1804.80	4.65	30.88
Lagged book value ($bv_{j,t-1}$)	834	576.41	150.60	0.75	13467.71	5.12	32.99
Cost of equity capital ($r_{j,t}$)	834	10.75%	10.38%	2.85%	21.16%	0.24	2.40
Risk-free rate (rf_t)	9	8.10%	7.67%	2.70%	12.59%	0.34	2.09
Systematic risk ($\beta_{j,t}$)	834	1.10	1.07	−0.59	2.57	0.15	2.51
Effective tax-rate (tax_t)	9	24.45%	24.41%	24.02%	24.94%	0.32	2.48
Market value of equity (P_t)	603	1365.79	323.55	2.73	80913.06	2.51	12.54

Fixed conversion rate (1 euro = 166.386 ESP) is used to convert accounting data into €.

for the first 'other information' variable, and is estimated using all historically available data from 1992 up to the forecast year, using the same methodology. The 'other information' variable depends on the estimated persistence of abnormal earnings (see equation (5)), and is computed as the difference between the consensus of the analysts' forecasts and the expectations based on current abnormal earnings:

$$v_{1t,j}=f_{t,j}^{a,t+1}-(\hat{\omega}_{11,t}+\hat{\omega}_{11,t}^{+}D_{1,j})_1 x_{t,j}^{a}$$

$$=(f_{t,j}^{t+1}-r_{t,j}\cdot bv_{t,j})-(\hat{\omega}_{11,t}+\hat{\omega}_{11,t}^{+}D_{1,j})x_{t,j}^{a}$$

for firm j in period t.

The contextual Feltham and Ohlson (1995) model also requires estimating the conservatism parameters for both negative abnormal earnings and positive ones: ω_{12} and $\omega_{12}+\omega_{12}^{+}$ respectively. All things being equal, the more (less) conservative the firm is, the higher (lower) future abnormal earnings will be. Therefore, we expect ω_{12} to be positive but close to zero (unbiased accounting), while $\omega_{12}+\omega_{12}^{+}$ should be greater than ω_{12} (e.g. ω_{12}^{+} should be positive and statistically significant).

In addition, the growth of book value of equity must be estimated to use this model. Although it can be based on the historic series of book value, the autoregressive model is problematic. If book value is increasing in time, the time series will be non-stationary; and if $\omega_{22}>(1+r)$, the book value of equity would increase indefinitely, and firm value could not be computed. Due to the low cost of capital at the end of the nineties, this could well happen in our sample. If $\omega_{22}<(1+r)$, but ω_{22} is close to 1+r, the value of the firm would be equally high. Therefore, to measure ω_{22} we follow Ohlson's suggestion (1998, footnote 9) and use the long term growth rate of the economy.[13] We think this is an appropriate solution in our research, as parameters do not vary among firms. We estimate the expected growth for each year t within the period 1992–1999 using the historic mean of the growth in the Spanish Gross Domestic Product (GDP) from 1986 to year t.[14] The value of the estimated growth parameter is 1 plus this mean growth. This can be considered a reasonable indicator of the expected sustainable growth of firms within a country; the rate is lower when there is an economic recession than in times of buoyancy, depending on investors' sense of uncertainty.

Regarding the second 'other information' variable v_{2t}, it is obtained as the difference between the expected book value of equity based on all available information and its expectation based on the GDP growth: $v_{2t}=E_t[bv_{t+1}]-\omega_{22}bv_t$. Taking into account the *clean surplus relation*, the expectation about book value at time t is: $E_t[bv_{t+1}]=bv_t+E_t[x_{t+1}]-E_t[d_{t+1}]$. In consistency with the estimation of the first 'other information' variable, we use the consensus analysts' earnings forecast to measure $E_t[x_{t+1}]$. As for the estimation of dividends, we have analysed the dividend pattern of Spanish companies and found there was a constant or slightly increasing tendency. Therefore, we compute: $E_t[d_{t+1}]=(1+g_t)d_t$, where g_t is the expected growth in dividends. This expected growth has been computed as the median of the historic increase in dividends considering all cases in the sample that pay dividends[15]: $(1+g_t)=median\,(d_t/d_{t-1})$. Consequently, the expected book value of equity is: $E_t[bv_{t+1}] = bv_t + f_t^{t+1} - (1 + g_t)d_t$, and this value, less the growth rate times the book value of equity, gives the second 'other information' variable. As the growth parameter considers the growth rate of all firms in the economy, the second 'other information' variable takes into account the differential growth rate of every firm, i.e., if a certain firm is expected to grow more or less than the rest ($v_{2t,j} = E_t[bv_{t+1\,j}] - \hat{\omega}_{22,t} bv_{t,j}$ for firm j in period t).

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[13] Previous papers have adopted different solutions. Myers (1999) uses the median of the ratio bv_{t+1}/bv_t, and Choi et al. [2001] use several fixed rates: 0, 2, 4 and 6%.

[14] We select 1986 as the first year, as this was the year Spain entered the European Economic Community, now European Union.

[15] The estimation of this rate with an autoregressive model would have had similar problems as the estimation of the growth parameter of book value of equity indicated above.

Table 4 provides the descriptive statistics concerning the key variables in the analysis. The first four rows refer to the 834 abnormal earnings (period 1991–1999), and the variables used to compute them: earnings, lagged book value and cost of equity capital. Then, the variables used to compute the cost of capital appear: risk-free rate, estimated systematic risk, and estimated effective tax-rate. Finally, the last row shows the market value of equity of the final 603 observations (period 1993–1999) for which intrinsic values are estimated.

All variables are positively skewed as usually happens with accounting figures due to the strong influence of large firms. It is worth noting that although the abnormal earnings mean is positive, the median is not, more than 50% of the cases are negative, and the distribution shows a high degree of kurtosis, as one would expect in a competitive environment. The extreme values of the distributions of the cost of capital and the risk-free rate are consistent with the strong reduction in interest rates which occurred during the 1990s mainly on account of European convergence policy across the euro-zone. Finally, we refer to market capitalisation which shows a wide range of variability in the sample; data not provided here indicate that, on average, the market price is double that of the book value of equity, suggesting a certain degree of conservatism.[16]

4. Empirical results

Following the research objectives, this section has been divided in three subsections. Firstly, we provide the results obtained in the estimation of the contextual LIMs; these can be considered a direct test of the adequacy of our contextual approach. Secondly, we report the predictive accuracy of our six models compared with other accounting-based models. Thirdly, we measure the ability of all models to explain market prices in order to see if the new approach improves the basic one for valuation purposes.

4.1. Predictive link:time series behaviour of abnormal profitability

The first part of our empirical analysis examines the autoregressive coefficients on abnormal profitability, book value, and 'other information' derived from the contextual OFO models, and compares them with those obtained in the non-contextual analysis.

The second and third columns of Table 5 report the results derived from the Ohlson (1995) model. The persistence of abnormal earnings is between 0.61 and 0.82, and the persistence of the 'other information' variable between 0.16 and 0.39. Thus, the 'other information' mean reverts at about three times the rate of abnormal earnings. These results are in line with those obtained in the previous literature (see Table 2), and are within the limits suggested in the LIM. The other six columns provide the results of the contextual analysis. The persistence of abnormal earnings differs between profit and loss firms. As expected, abnormal negative earnings are less likely to persist; their persistence is about 0.6 and suggests that negative losses revert in the long term, while positive ones persist at a higher rate close to 1 (according to the Wald test, it is not statistically different from 1). Therefore, in order to achieve stationarity in the following analyses, the coefficient for profit firms will be equal to 1.

As for the regression referring to the 'other information' variable, the last three columns provide the results. The autoregressive coefficients are between 0.14 and 0.37, therefore within the limits established by Ohlson (1995). These values are lower than those obtained in previous research (see Table 2) and slightly lower than those obtained in the non-contextual analysis (in the third column); this could be due to the higher persistence of abnormal positive earnings.

Regarding the estimation of the Feltham and Ohlson (1995) model, the non-contextual results appear in the second and third columns of Table 6. They are similar to those obtained in previous research (see Table 2), the earnings persistence coefficients are between 0.53 and 0.71, therefore within theoretical limits. As for the book value, contrary to the assumption in Feltham and Ohlson (1995), the parameters are negative and significant during the first part of the period under analysis. However, at the end of the period they become positive.

The other columns show the results of the first equation of the contextual LIM of Feltham and Ohlson (1995). As in Table 5, the persistence of abnormal negative earnings is intermediate, between 0.48 and 0.68, indicating that they only revert in the long term. However, the positive abnormal earnings persist indefinitely, only in 1995 the Wald test rejects that this is different to 1. The results of the conservatism parameter are more conclusive. They are always significant and

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[16] Using US data, Frankel and Lee (1998) also obtain a market-to-book ratio of 2.18.

Table 5
Estimated parameters of Ohlson (1995) LIM considering the sign of abnormal earnings

$D_{t,j}=1$ if abnormal earnings are positive for firm j at time t, and $D_{t,j}=0$ otherwise; $x^a_{j,t}$: abnormal earnings of firm j at time t; $bv_{j,t-1}$: book value of equity of firm j at time t–1; $v_{1j,t}$: 'other information' variable of firm j at time t obtained from: $v_{1j,t}=f^{a,t+1}_{t,j}-\hat{\omega}_{11,t}x^a_t-\hat{\omega}^+_{11,t}D_{t,j}x^a_{j,t}$, where $\hat{\omega}_{11,t}$, $\hat{\omega}^+_{11,t}$ are the estimated parameters that appear in this table (maximum value $\hat{\omega}_{11}+\hat{\omega}^+_{11}=1$); R^2: adjusted R^2 of each regression; N: number of observations; Wald(–): F statistic of Wald test that tests the null hypothesis H_0: $\omega_{11}=1$; Wald(+): F statistic of Wald test that tests the null hypothesis H_0: $\hat{\omega}_{11}+\hat{\omega}^+_{11}=1$.
The significance in column $\hat{\omega}_{11}+\hat{\omega}^+_{11}$ refers to the test H_0: $\hat{\omega}^+_{11}=0$.

	Non-contextual approach ($D_{1j}=0$ for all observations)		$\frac{x^a_{j,t}}{bv_{j,t-1}}=\omega_{11}\frac{x^a_{j,t-1}}{bv_{j,t-1}}+\omega^+_{11}D_1\frac{x^a_{j,t-1}}{bv_{j,t-1}}+u_{1j,t}$						$\frac{v_{1j,t}}{bv_{j,t-1}}=\gamma_1\frac{v_{1j,t-1}}{bv_{j,t-1}}+u_{2j,t}$		
Year	$\hat{\omega}_{11}$	$\hat{\gamma}_1$	$\hat{\omega}_{11}$	$\hat{\omega}_{11}+\hat{\omega}^+_{11}$	R^2	*N*	*Wald (–)*	*Wald (+)*	$\hat{\gamma}_1$	R^2	*N*
1993	0.82***	0.39**	0.81***	1.05*	0.64	177	4.61**	0.36	0.37**	0.17	89
1994	0.61***	0.16*	0.60***	1.07***	0.54	265	41.72***	0.97	0.14*	0.05	172
1995	0.62***	0.22**	0.60***	1.05***	0.51	350	40.76***	0.98	0.16*	0.04	249
1996	0.70***	0.24**	0.67***	1.03***	0.51	439	27.18***	0.19	0.19**	0.05	328
1997	0.67***	0.26**	0.62***	1.04***	0.47	528	36.51***	0.43	0.19**	0.05	407
1998	0.68***	0.32***	0.60***	1.09***	0.45	622	35.68***	3.41*	0.21***	0.05	493
1999	0.70***	0.39***	0.59***	1.09***	0.47	708	36.64***	3.71*	0.27***	0.07	573

*Significant at 10% **Significant at 5% ***Significant at 1%

negative for loss firms while positive for profit firms, the difference being significant at 1% in all periods. Consequently, it can be argued that either the Feltham and Ohlson (1995) model does not adequately describe the effect of conservatism for loss-making firms, or that accounting for these firms is not conservative, but on the contrary is in fact aggressive. This could provide a rationale for the change in the sign of the coefficient observed in the non-contextual analysis (see the third column in Table 6). Indeed during the second half of the 1990s, the good health of the Spanish economy allowed most firms to obtain positive abnormal earnings;[17] therefore, the conservatism coefficient is positive as expected.

The results of the other regressions of the Feltham and Ohlson (1995) LIM appear in table 7. As in Table 5, the persistence of the first 'other information' variable is higher when the sign of abnormal earnings is not considered: the autoregressive coefficients vary from 0.39 to 0.52 in the non-contextual analysis and from 0.26 to 0.43 in the contextual one.

Note that to measure the second 'other information' variable we need the growth in book value, which is based on the long term growth of the Spanish economy. The increase in GDP (column 6) is consistent with the evolution of the Spanish economy, which was in recession during the years 1992 and 1993, but improved throughout the decade, implying an increase in ROE and better growth expectations. The values obtained for the ω_{22} coefficient capture this effect and are lower than 1+r, in all cases. The results of the second 'other information' regression appear in the three last columns of Table 7 and are consistent with the assumption in Feltham and Ohlson (1995); the estimated values of the persistence coefficients are between 0.37 and 0.88.

In summary, our empirical results support the Ohlson (1995) model, and in particular the contextual approach developed in this research. However, the results of the conservatism parameter are contrary to Feltham and Ohlson (1995)'s theoretical model. When we test the contextual version of this model, the results are slightly better; the sign of the parameter is contrary to the predictions but only for the abnormal loss-making firms. These results are consistent with the profitability effect found in Ahmed et al. (2000), where less profitable firms have negative conservatism parameters.[18] This suggests that the parameter is more linked to profitability than to the accounting system. Having said this, we want to point out that both aspects could be linked, i.e., loss-making firms might have aggressive accounting, while profit-making firms might have conservative accounting.[19]

In order to provide some evidence of parameter stability over time, Table 8 provides the main results of the year-by-year cross-sectional regressions. The results of the contextual Ohlson (1995) first equation confirm that positive abnormal earnings persist generally at a high rate. However, negative abnormal earnings are not stable over time as the estimated coefficients vary considerably. Moreover, during the first part of the decade negative abnormal earnings are more persistent which is consistent with the behaviour of the Spanish economy at that time (see Table 7 for the growth rate of Spanish GDP). The results of the contextual Feltham and Ohlson (1995) LIM are very similar. With regard to the conservatism parameter, they show the same trend as in the pooled regressions. Therefore, in general terms, these results confirm the parameter stability over time. In addition as the valuation and forecasting tasks look into the future, and predictions should not depend on events in a particular year, we use regression coefficients based on pooled data. Thus, in the following analyses we use the coefficients that appear in Tables 5 to 7.

4.2. Predictive link: accuracy in predicting abnormal earnings

In this section we report on the comparative analysis of the predictive accuracy of our six models with two derived from the previous literature: the transitory model and the permanent one used by Dechow et al. (1999) which do not need the estimation of any parameter. In addition we take into account the OFO models, using the parameters estimated in the non-contextual approach. We consider several time horizons, from one to six years, and compute forecast errors by subtracting the abnormal earnings forecast for year t+τ from the realised abnormal earnings. All forecast errors are deflated by book value of equity:

$$\left|\left(E_t\left[x^a_{t+\tau,j}\right]-x^a_{t+\tau,j}\right)/bv_{t+\tau,j}\right|$$

Table 9 shows that considering the non-contextual models, the lowest forecast errors are obtained for the Ohlson (1995) model: only in the very long term (five or six years) does the transitory model provide similar results. These results confirm Ohlson (1995)'s assumption about the reversion of

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[17] Throughout the period 1991 to 1994, the average annual ROE for the firms in the sample was low, even negative (4%, –4%, –7% and 6%), while from 1995 to 1999 it increased from 12% to 17%.

[18] Ahmed et al. (2000) report in Table 3 median returns of 13.3% and 8.3% for firms with positive and negative parameter respectively. Considering that the cost of capital during the period under their analysis is between 10–12%, firms with positive (negative) parameter would have had positive (negative) abnormal returns.

[19] These results do not vary if the variables are per share or deflated by total assets.

Table 6

Estimated parameters of Feltham and Ohlson (1995) LIM considering the sign of abnormal earnings (abnormal earnings and conservatism)

$D_{t,j}=1$ if abnormal earnings are positive for firm j at time t, and $D_{t,j}=0$ otherwise; $x^a_{j,t}$: abnormal earnings of firm j at time t; $bv_{j,t-1}$: book value of firm j at time t-1; R^2: adjusted R^2 of each regression; N: number of observations; Wald(–): F statistic of the Wald test that tests the null hypothesis H0: $\omega_{11}=1$; Wald(+): F statistic of the Wald test that tests the null hypothesis H_0: $\omega_{11}+\omega^+_{11}=1$.
The significance in columns $\hat{\omega}_{11}+\hat{\omega}^+_{11}$ and $\hat{\omega}_{12}+\hat{\omega}^+_{12}$ refers to the tests H_0: $\hat{\omega}^+_{11}=0$ and H_0: $\hat{\omega}^+_{12}=0$ respectively.

$$\frac{x^a_{j,t}}{bv_{j,t-1}} = \omega_{11}\frac{x^a_{j,t-1}}{bv_{j,t-1}} + \omega^+_{11}D_1\frac{x^a_{j,t-1}}{bv_{j,t-1}} + \omega_{12}\frac{bv_{j,t-1}}{bv_{j,t-1}} + \omega^+_{12}D_1\frac{bv_{j,t-1}}{bv_{j,t-1}} + u_{1j,t}$$

	Non-contextual approach ($D_{1j}=0$ for all observations)									
Year	$\hat{\omega}_{11}$	$\hat{\omega}_{12}$	$\hat{\omega}_{11}$	$\hat{\omega}_{11}+\hat{\omega}^+_{11}$	$\hat{\omega}_{12}$	$\hat{\omega}_{12}+\hat{\omega}^+_{12}$	R^2	*N*	*Wald (–)*	*Wald (+)*
1993	0.71***	–0.072***	0.68***	1.05**	–0.085***	0.001***	0.67	177	11.52***	0.20
1994	0.53***	–0.042***	0.48***	0.97***	–0.063***	0.019***	0.57	265	55.07***	0.14
1995	0.58***	–0.022***	0.48***	0.87***	–0.055***	0.042***	0.54	350	53.75***	4.73**
1996	0.68***	–0.013***	0.54***	0.87***	–0.048***	0.035***	0.54	439	37.82***	2.28
1997	0.66***	–0.003	0.50***	0.90***	–0.044***	0.031***	0.50	528	45.14***	1.97
1998	0.69***	0.008*	0.49***	0.94***	–0.038***	0.032***	0.47	622	42.00***	0.98
1999	0.71***	0.012**	0.48***	0.93***	–0.039***	0.033***	0.49	708	44.30***	1.39

*Significant at 10% **Significant at 5% ***Significant at 1%

Table 7
Estimated parameters of Feltham and Ohlson (1995) considering the sign of abnormal earnings (other information and firm growth)

$v_{1t,j}$: 'other information' relevant to predict abnormal earnings: $v_{1j,t}=f_{j,t}^{a,t+1}-(\hat{\omega}_{11,t}+\hat{\omega}_{11,t}^{+}D_{t,j})x_{j,t}^{a}-(\hat{\omega}_{12,t}+\hat{\omega}_{12,t}^{+}D_{t,j})bv_{j,t}$. where $\hat{\omega}_{11,t}$, $\hat{\omega}_{11,t}^{+}$ y $\hat{\omega}_{12,t}$ are the estimated coefficients that appear in table 6; $x_{j,t}^{a}$: abnormal earnings of firm j at time t; $bv_{j,t}$: book value of firm j at time t; $v_{2t,j}$: 'other information' relevant to predict book value of equity: $v_{2j,t}=E_t[bv_{j,t+1}]-\hat{\omega}_{22,t}bv_{j,t}$. where $\hat{\omega}_{22,t}$ is the parameter that appears in this table, $E_t[bv_{j,t+1}]$ is expected book value for period t+1: $E_t[bv_{t+1}]=bv_t+f_t^{t+1}-(1+g_t)d_t$, G_{GDP}: growth rate of the Spanish GDP in year T (in percentage), $\omega_{22,t}$: growth parameter measured as 1 plus the average growth in Spanish GDP since 1986 until period T; R^2: adjusted R^2 of each regression; N: number of observations

	Non-contextual approach ($D_{1,j}=0$ for all observations)	$\frac{v_{1j,t}}{bv_{j,t-1}}=\gamma_1\frac{v_{1j,t-1}}{bv_{j,t-1}}+u_{3j,t}$			**Firm growth**		$\frac{v_{2j,t}}{bv_{j,t-1}}=\gamma_2\frac{v_{2j,t-1}}{bv_{j,t-1}}+u_{4j,t}$		
Year	$\hat{\gamma}_1$	$\hat{\gamma}_1$	R^2	*N*	G_{GDP}	ω_{22}	$\hat{\gamma}_2$	R^2	*N*
1993	0.52***	0.43***	0.34	89	–1.00%	1.0143	0.65***	0.30	82
1994	0.32***	0.27***	0.14	172	2.38%	1.0162	0.37***	0.14	165
1995	0.39***	0.29***	0.14	249	2.76%	1.0181	0.47***	0.17	243
1996	0.41***	0.32***	0.13	328	2.44%	1.0190	0.60***	0.27	323
1997	0.40***	0.28***	0.10	407	4.03%	1.0216	0.73***	0.36	404
1998	0.41***	0.26***	0.09	493	4.13%	1.0238	0.82***	0.44	490
1999	0.44***	0.26***	0.09	573	4.10%	1.0255	0.88***	0.50	570

*Significant at 10% **Significant at 5% ***Significant at 1%

Table 8
Annual regressions of the first equation of the contextual LIMs considering the sign of abnormal earnings

Contextual Ohlson first equation:

$$\frac{x^a_{j,t}}{bv_{j,t-1}} = \omega_{11}\frac{x^a_{j,t-1}}{bv_{j,t-1}} + \omega^+_{11}D_1\frac{x^a_{j,t-1}}{bv_{j,t-1}} + u_{1j,t}$$

Contextual Feltham and Ohlson first equation:

$$\frac{x^a_{j,t}}{bv_{j,t-1}} = \omega_{11}\frac{x^a_{j,t-1}}{bv_{j,t-1}} + \omega^+_{11}D_1\frac{x^a_{j,t-1}}{bv_{j,t-1}} + \omega_{12}\frac{bv_{j,t-1}}{bv_{j,t-1}} + \omega^+_{12}D_1\frac{bv_{j,t-1}}{bv_{j,t-1}} + u_{1j,t}$$

The significance in columns $\hat{\omega}_{11}+\hat{\omega}^+_{11}$ and $\hat{\omega}_{12}+\hat{\omega}^+_{12}$ refers to the test H_0: $\hat{\omega}^+_{11}=0$ and H_0: $\hat{\omega}^+_{12}=0$ respectively; R^2: adjusted R^2 of each regression; N: number of observations in each year.
The significance of the mean regression has been obtained using the Fama and MacBeth method.

	Contextual Ohlson first equation				Contextual Feltham and Ohlson first equation					
Year	$\hat{\omega}_{11}$	$\hat{\omega}_{11}+\hat{\omega}^+_{11}$	R^2	*N*	$\hat{\omega}_{11}$	$\hat{\omega}_{11}+\hat{\omega}^+_{11}$	$\hat{\omega}_{12}$	$\hat{\omega}_{12}+\hat{\omega}^+_{12}$	R^2	*N*
1992	1.28***	0.90**	0.79	83	1.08***	1.14	–0.087***	–0.056*	0.83	83
1993	0.69***	1.25***	0.61	94	0.60***	1.17***	–0.056**	0.015***	0.62	94
1994	0.32***	1.09***	0.34	88	0.31**	0.94***	–0.009	0.026**	0.33	88
1995	0.18	1.04***	0.30	85	–0.03	0.81***	–0.076***	0.059***	0.40	85
1996	0.49***	0.92**	0.40	89	0.36**	0.80***	–0.048*	0.027***	0.44	89
1997	0.10	1.08***	0.37	89	–0.00	0.97***	–0.030	0.023	0.37	89
1998	–0.32	1.12***	0.64	94	–0.33	0.93***	–0.004	0.039**	0.65	94
1999	0.08	1.13***	0.75	86	–0.02	0.97***	–0.041***	0.031***	0.78	86
Mean	0.35*	1.07***	0.52		0.25	0.97***	–0.044***	0.0205	0.55	

*Significant at 10% **Significant at 5% ***Significant at 1%

Table 9
Accuracy of the abnormal earnings forecasts (Mean absolute forecast errors)

Absolute forecast errors are computed: $|(E_t[x^a_{t+\tau,j}]-x^a_{t+\tau,j})/bv_{t+\tau,j}|$, where $E_t[x^a_{t+\tau,j}]$: abnormal earnings forecast for period t+τ and firm j, computed as explained in section 3.1; *xat+τ,j*: abnormal earnings of firm j in period (t+τ–1, t+τ); $bv_{j.+\tau t}$: book value of firm j at time t+τ, t=1993–1998; τ=1–6 years; N: number of forecast errors computed.

Non-contextual models	**τ=1**	**τ=2**	**τ=3**	**τ=4**	**τ=5**	**τ=6**
Transitory	0.0887***	0.0877***	0.0833***	0.0820***	0.0822***	0.0802***
Permanent	0.0582***	0.0807***	0.1003***	0.1152***	0.1372***	0.1716***
Ohlson (1995)	**0.0457**	0.0689***	0.0769***	0.0772***	0.0824**	0.0831**
Feltham and Ohlson (1995)	**0.0457**	0.0731***	0.0961***	0.1197***	0.1478***	0.1726***
N	496	395	306	222	142	65
Contextual models	**τ=1**	**τ=2**	**τ=3**	**τ=4**	**τ=5**	**τ=6**
1	0.0603***	0.0691*	0.0703	0.0737	**0.0754**	**0.0754**
2	0.0542***	0.0713**	0.0761*	0.0844***	0.0895***	0.1006***
3	**0.0457**	0.0680	0.0706	0.0714	0.0759	0.0762
4	**0.0457**	**0.0654**	**0.0700**	**0.0709**	0.0782	0.0811
5	**0.0457**	0.0756***	0.0989***	0.1148***	0.1388***	0.1659***
6	**0.0457**	0.0764***	0.0999***	0.1155***	0.1369***	0.1635***
N	496	395	306	222	142	65

The lowest forecast errors appear in bold type.
* With a significance of 10%, the forecast error significantly differs from the lowest forecast error
** Idem at 5% ***Idem at 1%

abnormal earnings to zero. The results also confirm that analysts' forecasts of abnormal earnings are more accurate than the forecasts generated by the historical time-series models for horizons up to four years. The Feltham and Ohlson (1995) model produces less accurate predictions than the other models especially at long horizons, which could be due to the effect of the negative conservatism coefficient. For all time horizons the contextual models achieve lower forecast errors than the non-contextual ones.

To provide a more rigorous analysis we performed a t-test on the equality of means using paired data. The null hypothesis is that the difference in the forecast errors between two competing models has a zero mean. We choose as the base model for the comparison the one with the lowest forecast error in each time horizon. Thus, the tests indicate which models behave significantly worse than the best model. The results, with the only exception of the following year prediction for the OFO models, show that the errors of contextual model 4 are significantly lower (generally at 1%) than those derived from the four non-contextual models. Nevertheless, when long time horizons are considered, the two restricted contextual models 1 and 3 produce as good forecasts as model 4. It seems that analysts' forecasts play a major role in the prediction of abnormal earnings but only at the short term horizon, about two years. Therefore, according to these results the best way to predict abnormal earnings is to consider negative abnormal earnings as purely transitory or less permanent than positive abnormal earnings, which appear to remain during a relatively long period.

Models 5 and 6 produce the largest forecast errors; in order to appreciate if their poor performance is related to the sign of abnormal earnings, Table 10 shows separately the forecast errors derived from the two groups of profitable and non-profitable firms. The average forecast errors of firms with expected positive abnormal earnings are very similar for the six models considered and lower than those derived from loss-making firms. T-tests of difference of means reveal that in most of the cases the differences are not significant, so these results suggest models 5 and 6 forecast abnormal earnings as accurately as the Ohlson models for profit-making firms. However, when loss-making firms are considered they perform poorly. We attribute these results to the negative conservatism parameter obtained in the contextual LIM. To forecast abnormal earnings for loss-making firms, the best strategy is to use model 4,

Table 10
Accuracy of the abnormal earnings forecasts considering the sign of abnormal earnings

Absolute forecast errors are: $|(E_t[x^a_{t+\tau,j}] - x^a_{t+\tau,j}) / bv_{t+\tau,j}|$, where $E_t[x^a_{t+\tau,j}]$: abnormal earnings forecast for period t+τ and firm j, computed as explained in section 3.2; $x^a_{t+\tau,j}$: abnormal earnings of firm j in period (t+τ–1, t+τ); $bv_{j,+\tau t}$: book value of firm j at time t+τ, t=1993–1998; τ=1–6 years; N: number of forecast errors computed.

(+) Observations with positive expected abnormal earnings: $E_t[D_{t+1}] = 1$
(–) Observations with negative expected abnormal earnings: $E_t[D_{t+1}] = 0$

Model	τ=1	τ=2	τ=3	τ=4	τ=5	τ=6
1 (+)	0,0426**	**0,0529**	**0,0573**	0,0711**	**0,0718**	**0,0739**
2 (+)	0,0426**	**0,0529**	**0,0573**	0,0711**	**0,0718**	**0,0739**
3 (+)	**0,0405**	0,0549*	0,0593	0,0678	0,0775	0,0819
4 (+)	**0,0405**	0,0553*	0,0606	0,0651	0,0781	0,0883
5 (+)	**0,0405**	0,0555*	0,0615	**0,0604**	0,0732	0,0908**
6 (+)	**0,0405**	0,0561*	0,0626	0,0624*	0,0733	0,0911**
1 (–)	0,0769***	0,0816	0,0782	0,0750	0,0769	0,0758
2 (–)	0,0665***	0,0862*	0,0876**	0,0914***	0,0969***	0,1080***
3 (–)	**0,0519**	0,0800*	0,0788	**0,0735**	**0,0752**	**0,0741**
4 (–)	**0,0519**	**0,0747**	**0,0769**	0,0743	0,0782	0,0786
5 (–)	**0,0519**	0,0941***	0,1258***	0,1466***	0,1682***	0,1924***
6 (–)	**0,0519**	0,0951***	0,1268***	0,1467***	0,1655***	0,1891***
N	**496**	**395**	**306**	**222**	**142**	**65**

The lowest forecast errors appear in bold type.
* With a significance of 10%, the forecast error significantly differs from the lowest forecast error
** Idem at 5% ***Idem at 1%

which takes into account analysts' forecasts. However, for long time horizons models 1 and 3, which consider negative abnormal earnings as purely transitory, provide similar results. This suggests abnormal negative earnings revert to zero after about four years. For this subgroup of firms, taking into account analysts' information and using a close-to-zero persistence of abnormal earnings seems to be the best strategy.

4.3. Valuation link:explanation of stock prices

The relative ability of the six competing valuation models to explain contemporaneous stock prices is shown in Table 11, where we show the mean and median intrinsic value/market price (V/P) ratios; as previously we include the four non-contextual models. We calculated the ratio for each firm and year in the period 1993–1999, thus in total we estimated 603 ratios for each model. The expectation is that the contextual models provide an unbiased estimation of the value of equity, so the statistics should be close to one, while the non-contextual models should provide a more biased result.

In this analysis, we used a t-test to examine if the mean of the V/P ratios for each model is equal to 1. In addition, we tested the equality of the V/P medians using the Wilcoxon signed-ranks test. The results in panel A of Table 11 for the four non-contextual models are in line with those obtained in the literature (see Dechow et al. 1999 and Myers 1999). All these models undervalue equity relative to the stock market; the mean and median ratios are lower than 0.8, significantly different from 1 at 1%; V/P is lower than that value in approximately 75% of the observations. Panel B reports the results of the contextual models; firm valuation improves and the number of cases with undervaluation and overvaluation is more balanced. There are two models that obtain unbiased results: model 1, which considers extreme persistence according to current profitability; and model 3, which takes into account the 'other information' and uses a transitory model if expected abnormal earnings are negative, and a persistent model if expected abnormal earnings are positive. These results are consistent with those obtained in the predictive link (Tables 9 and 10).

However, models 5 and 6 overvalue equity relative to the stock market. This is a paradoxical result, because in the non-contextual analysis the Feltham and Ohlson (1995) model undervalues equity. In an effort to understand these anomalous results, we have disaggregated the observations

Table 11
Descriptive statistics of the V/P ratio

Mean: mean of the V/P ratio at the end of year t (t=1993–1999). Median: median of the V/P ratio. Total number of observations: 603.

Panel A: V/P ratio for non-contextual models

Models	*Mean*	*Median*	*Observations with V>P*	*Observations with V<P*
Transitory	0.7862***	0.6580***	152	451
Permanent	0.7553***	0.7122***	161	442
Ohlson [1995]	0.7975***	0.7055***	145	458
Feltham and Ohlson [1995]	0.6354***	0.4794***	120	483

Panel B: V/P ratio for contextual models

Models	*Mean*	*Median*	*Observations with V>P*	*Observations with V<P*
1	1.0430*	0.9341*	267	336
2	0.9444**	0.8599***	235	368
3	1.0438*	0.9382	265	338
4	1.0600**	0.9172**	253	350
5	2.0016***	1.1590***	317	286
6	2.3777***	1.3767***	331	272

Panel C: Mean values of the V/P ratio considering the sign of abnormal earnings

(+) Observations with positive expected abnormal earnings: $E_t[D_{t+1}] = 1$
(–) Observations with negative expected abnormal earnings: $E_t[D_{t+1}] = 0$

	(+)	*(+)*	*(+)*		*(–)*	*(–)*	*(–)*	
Models	*Mean*	*Median*	*V>P*	*V<P*	*Mean*	*Median*	*V>P*	*V<P*
1	1.0175	0.9177**	141	194	1.0749**	0.9799	126	142
2	1.0175	0.9177**	141	194	0.8530***	0.8156***	94	174
3	1.0511*	0.9127	154	198	1.0337	0.9528	111	140
4	1.0875***	0.9404	158	194	1.0215	0.8922***	95	156
5	3.2553***	2.3417***	309	43	0.2434***	0.0000***	8	243
6	3.9028***	2.7945***	322	30	0.2389***	0.0000***	9	242

*Significantly different to 1 at 10% **Idem at 5% ***Idem at 1%

taking into account the sign of abnormal earnings. Panel C in the same table reports the results. Firms with expected positive (negative) abnormal earnings have the largest positive (negative) errors when models 5 and 6 are used. Considering the number of observations, there is a clear relationship between the sign of the abnormal earnings and the over/undervaluation (about 87% of firms with positive abnormal earnings are overvalued, and about 97% of those with abnormal losses are undervalued). It is our belief that this could be due to the sensitivity of the intrinsic values to the conservatism parameter. As this parameter affects book value, and book value grows in time, if the conservatism parameter is positive (negative), expected abnormal earnings increase (decrease) at high rates instead of reverting to zero; as computed intrinsic values become too high (low), this implies large positive (negative) valuation errors. Regarding the four Ohlson (1995) based models, panel C suggests they are able to explain the prices of both types of firms similarly. The four models perform nearly equally for profitable firms (recall that they assume high persistence $\omega_{11}=1$), although including analysts' earnings forecasts produces a slight overvaluation. However, according to the mean ratios only models 3 and 4 explain prices of loss-making firms without bias. Both models include the 'other information' variable, and the persistence parameter for abnormal negative earnings of model 4 is about 0.59 (see the fourth column in Table 5). Therefore, it seems that investors consider bad performance as relatively persistent and they pay attention to analysts' forecasts.

This evidence suggests that the best strategy for the valuation task is to employ the accounting valuation models based on Ohlson (1995) which consider analysts' forecasts and use high persistence parameters for firms with positive abnormal earnings and use lower, or even zero, parameters for firms with negative abnormal earnings.

We also estimate the valuation accuracy of each model. Table 12 reports the mean and median absolute valuation errors obtained with the 603 intrinsic values; to this end we subtracted the observed stock price t from the intrinsic value and divided by that price: $(|V_{j,t}-P_{j,t}|)/P_{j,t}$. We performed t-tests to examine whether the difference in the valuation errors between two competing models has a zero mean comparing each valuation model error with the lowest one. As for the comparison of the median errors, we performed tests on the equality of medians using the Wilcoxon matched-pairs signed-ranks test.

Panel A provides the results of the non-contextual analysis; all models generate large valuation errors, the smallest undervaluation was obtained with the Ohlson (1995) model and the largest with Feltham and Ohlson (1995), 0.39 and 0.60 respectively. These errors are in line with previous research; Dechow et al. (1999) obtain about 0.40 with all models they use, and McCrae and Nilsson (2001) get 0.49 when the first 'other information' variable is not included and 0.46 when it is considered. When the errors derived from the profit-making firms and the loss-making firms are separated (see the four last columns), in the first group the permanent model achieves the lowest mean error, 0.37, while in the second group the transitory model produces an error of 0.35. These results suggest the adequacy of adopting a contextual approach to the valuation, as proposed in this research.

Panel B reports the valuation errors of the contextual models; they are consistent with the evidence obtained in our previous analyses. Models 1 to 4 derived from Ohlson (1995) are more accurate than the non-contextual ones. The mean and median difference tests indicate that models 1, 3 and 4 have valuation errors similar, but significantly lower (at 1%) than the errors generated by the non-contextual Ohlson (1995) model. It appears that investors perceive abnormal profits as permanent (recall that the four models use $\omega_{11}=1$ for this type of firm), and abnormal losses as more or less transitory. However, model 2 is significantly (at 1%) less accurate than the other three models. In the fourth and sixth columns we report the mean errors of firms with expected positive and negative abnormal earnings. The valuation errors are lower for profitable companies than for loss-making firms (the lowest in the first group is 0.34 while in the second group is 0.36). Model 3, which incorporates the first 'other information' variable, is the most accurate for the positive abnormal earnings cases. However, the four contextual models based on Ohlson (1995) perform similarly. When dealing with observations of negative abnormal earnings, models 1, 3 and 4 generate the most accurate valuations, while model 2 is significantly (at 1%) worse than any of them. The median tests provide similar results. Therefore, it seems that to use an intermediate parameter (about 0.59) is not as adequate as using a null parameter (model 1 and 3) or taking into account analysts' forecasts (model 4). Regarding models 5 and 6, the results are not surprising; they achieve the least accurate results, mainly for loss-making firms.[20]

Sensitivity analysis of the conservatism parameter

To analyse if the conservatism parameter could have influenced the poor results achieved in the

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[20] We have repeated the study without considering the possible switch of sign in expected abnormal earnings. We used a constant dummy D that takes a value of 1 in all periods if current abnormal earnings are positive and 0 otherwise. The results are similar to those presented here. The results also remain unaltered if the constant dummy D takes a value of 1 if expected abnormal earnings for t+1 are positive and 0 otherwise.

Table 12
Accuracy of alternative valuation models considering the sign of abnormal earnings

Valuation errors are $(|V_{j,t}-P_{j,t}|)/P_{j,t}$, where $V_{j,t}$: intrinsic value for year t and firm j, computed as explained in section 3.1; $P_{j,t}$.,stock price for year t and firm j; MAVE: Mean absolute valuation error; Median AVE: median of the absolute valuation errors; Period: 1993–1999; Total number of errors: 603.

(+) Observations with positive expected abnormal earnings: $E_t[D_{t+1}] = 1$
(–) Observations with negative expected abnormal earnings: $E_t[D_{t+1}] = 0$

Panel A: Non-contextual analysis

	MAVE	*Median AVE*	*(+) MAVE*	*(+) Median AVE*	*(–) MAVE*	*(–) Median AVE*
Transitory	0.4325***	0.4239***	0.4868***	0.4892***	**0.3563**	**0.2730**
Permanent	0.4612***	0.4019***	0.3799***	0.3319***	0.5752***	0.5326***
Ohlson [1995]	0.3952***	0.3550***	0.4142***	0.4081***	0.3686	0.2863
Feltham and Ohlson [1995]	0.6097***	0.6184***	0.5713***	0.5897***	0.6637***	0.6870***

Panel B: Contextual analysis

	MAVE	*Median AVE*	*(+) MAVE*	*(+) Median AVE*	*(–) MAVE*	*(–) Median AVE*
Model 1	0.3549	**0.2878**	0.3475	**0.2758**	0.3641	0.3179
Model 2	0.3782***	0.3169***	0.3475	**0.2758**	0.4165***	0.3464**
Model 3	**0.3538**	0.2935*	**0.3451**	0.2933*	0.3660	0.2935
Model 4	0.3602	0.2917	0.3534	0.3008*	0.3698	0.2839
Model 5	0.8454***	0.8961***	0.7785***	0.7173***	0.9393***	0.9190***
Model 6	0.8832***	0.9229***	0.8374***	0.8669***	0.9474***	0.9562***

The lowest valuation errors appear in bold type.
* With a significance of 10%, the valuation error significantly differs from the lowest valuation error.
** Idem at 5% ***Idem at 1%

predictive link and in the *valuation link* with the Feltham and Ohlson (1995) model, we performed additional tests. As the seventh column of Table 6 indicates, the conservatism parameter is positive for firms with positive abnormal earnings and lower in years 1993 and 1994 than others. Results not reported here indicate that in 1993 the V/P ratios for models 5 and 6 are about 0.70 (undervaluation), while for 1994 are about 2 (overvaluation); this suggests that for the valuation task, to employ a parameter of ω_{12}=0.001 is probably too low, while ω_{12}=0.019 is too high. It seems that the results are sensitive to the conservatism parameter, and this could explain the poor results of the model. We re-calculated the valuation errors for models 5 and 6, using the values estimated for the LIM (in Tables 6 and 7) but with different values for the conservatism parameter, between –0.02 and 0.02 lower in absolute terms than those obtained in the estimation of the LIM (see Table 6). Results not reported here indicate that the errors are very sensitive to the value of the parameter, and the model only explains with relative accuracy market prices when it is between 0 and 0.0025. Nevertheless, the valuation errors were never lower than those obtained with the Ohlson (1995) model.[21]

5. Conclusions

This paper provides an empirical assessment of the OFO models distinguishing between firms with positive and negative abnormal earnings. This distinction is based on the results of Hayn (1995) and Collins et al. (1999) that show that investors have different perceptions about profit and losses. We use two different contextual linear information dynamics, which imply different earnings prediction models and different valuation functions for profit-making firms and loss-making firms. We want to highlight the effort made in order to measure the second 'other information' variable employed to predict the future book value in the Feltham and Ohlson (1995) model, something that has not been considered in previous published empirical studies. Our empirical analysis refers to the period 1992–1999, and uses a sample of Spanish firms quoted on the Madrid S.E. Our results suggest that the contextual approach improves the prediction of future abnormal earnings and the explanation of current prices.

Regarding the estimation of the LIM coefficients, our empirical results generally support the Ohlson (1995) model, and in particular the contextual approach developed in this research. However, as in the previous empirical literature the results of the conservatism parameter of the Feltham and Ohlson (1995) model are contrary to the theory. The contextual version of this model provides slightly better results than the original one; the sign of the parameter is contrary to the predictions, but only for firms with negative abnormal earnings.

As for the prediction of abnormal earnings, the Ohlson (1995) model generates the lowest forecast errors, and only in the long term the transitory model provides similar results. These results confirm Ohlson's assumption about the reversion of abnormal earnings to zero. However, the accuracy of the contextual models is higher for all time horizons. Although models derived from Feltham and Ohlson (1995) produce the largest forecast errors, if we separate those obtained for loss-making firms and profit-making firms, the results show that the largest forecast errors derive from the former.

These results suggest that the contextual models that use high persistence parameters for abnormal earnings are the best strategy to forecast abnormal earnings for a profit-making firm. As for a loss-making firm, the best strategy is to use a contextual model that considers a null persistence parameter, or an intermediate one that includes analysts' forecasts.

The results for the *valuation link* are consistent with those obtained in the *predictive link*. They support the use of models based on Ohlson (1995) which consider different persistence parameters for firms with positive and negative abnormal earnings (or a transitory model if abnormal earnings are negative, and a persistent one if they are positive), and take into account the first 'other information' variable.

To summarise, our results confirm that investors perceive positive and negative abnormal earnings differently. Firms with negative earnings are valued using transitory models or models that consider a lower persistency relative to firms with positive abnormal earnings, while firms with positive abnormal earnings are valued using permanent models.

To conclude, we would like to mention some limitations of our research. First, the sample size is not large, including only 124 firms, and the analysis is limited to a 10-year period. Therefore, we have been forced to use the methodology of pooled time-series cross-sectional regressions. Second, as in many other studies the measurement of the variables is based on a number of assumptions that could affect our results. Third, the first 'other information' variable is based on the analysts' forecasts, so it assumes they are unbiased and incorporate all available new information, but there is certain evidence that contradicts these ideas. As for the second 'other information' variable, we are aware that its estimation has implied some arguable assumptions, but there are no empirical studies to compare with. Finally, we have to refer to the impact of the possible switches in sign. Although solved empirically, we recognise there are theoretical problems in the solution, as we have not taken into account the random nature of the variables.

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[21] These results remain unaltered for the loss- and profit-making firms when different growth parameters (ω_{22} between 1 and 1.03) and different values of the persistence parameters (ω_{11} and γ_1 between 0.25 and 0.75) are used.

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The ABI guidelines for share-based incentive schemes: setting the hurdle too high?

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Abstract—This paper examines, from the perspective of the pay-performance connection, the guideline principles issued since 1984 by the Association of British Insurers (ABI) in connection with the operation of share-based incentive schemes for executives. In particular, attention is paid to the marked change in emphasis that emerged in the 1999 guidelines. The four main dimensions to these guidelines concern: (i) phasing of issue by use of regular awards; (ii) setting of performance criteria (hurdles) against a peer group or bench-mark; (iii) restricting any re-testing of satisfaction of such performance criteria; and (iv) instituting a sliding scale of reward contingent on the performance out-turn against criteria. Results are derived from a simulation over a 14 year period of the implementation of such guidelines in a sample of companies traded on the London Stock Exchange. Empirical results suggest that the pay-performance connection is not always made stronger by setting the hurdle ever higher, and that higher hurdles are best tempered by some latitude in terms of re-testing. The results also highlight the importance of the choice of method of reporting the performance of Executive Share Options when communicating with shareholders and other stakeholders.

1. Introduction

Since the passage of the Finance Act 1984, Executive Share Options (ESOs) have become an increasingly important component of executive remuneration. In addition to the tax advantages initially available by satisfying some relatively mild conditions, this means of remuneration continues to hold out the possibility of achieving a clear link between the executive's pay and company performance. Studies in the US (e.g., Jensen and Murphy, 1990a and Hall and Liebman, 1998) and in the UK (e.g., Main et al., 1996 and Conyon and Murphy, 2000) have established that equity components of pay such as share options serve to strengthen the pay-performance relationship in the boardroom. From the initial outbreak of boardroom enthusiasm for this means of executive remuneration, the prospect of equity dilution through over-zealous use of such schemes prompted institutional shareholders to take an interest. In particular, the Association of British Insurers (ABI) has, through the promulgation and dissemination of various codes of practice,[1] emerged as the lead organisation in the regulation of these share-based incentive schemes.

The most recent set of consolidated ABI guidelines was issued in November 2005 and reflects a prolonged process of external scrutiny of top executive pay practices and procedures. A process which through the Cadbury (1992), Greenbury (1995), Hampel (1998), and Higgs (2003) reports can best be described as self-regulation,[2] although the recent introduction of the Directors' Remuneration Report Regulations 2002 represents a rare government intervention.[3] One consequence of these various reports, and of the Greenbury Report in particular, was to move companies away from ESOs towards more complex Long Term Incentive Plans (Ltips).[4] Nevertheless, ESOs remain empirically important and continue to provide a standard against which other incentive pay schemes may be judged.

The ABI (1999) guidelines mark a fairly radical departure from what had gone before. The detail of the development of these guidelines and the way in which they provide guidance to boards and remuneration committees is provided below but, in essence, the novelty comprises a move away from using the 'four-times-emoluments' guide as a ceiling for option issue towards encouraging a 'phas-

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[1] See, for example, Association of British Insurers (1987, 1991, 1993, 1994, 1995, 1999, 2001, 2003, 2004, 2005).

[2] Blundell and Robinson (1999) provide an extensive discussion on the prevalence and potential of such arrangements in the economy.

[3] The main impact being that shareholders are allowed to vote on the report of the remuneration committee. See the original discussion paper DTI (1999). See also the report in the *Financial Times* 21 May 2003:21, for a discussion of the rejection of the GlaxoSmithKline (CEO Dr Jean-Pierre Garnier) remuneration report. This is the most dramatic use of these powers to date.

[4] For an examination of the impact of this move to Ltips, see Buck et al. (2003).

ing' of ESO issue in a regular manner, in preference to having a somewhat lumpy issue once every three or four years. Markedly more emphasis is now placed on setting challenging performance criteria (or 'hurdles') before the ESOs vest, and performance is to be judged on a relative basis, using peer groups or performance bench marks. One version of a challenging performance criterion mentioned but not specifically required in the ABI guidelines, and certainly commonly touted in the business press, is the issue of executive share options with a strike price that is at a 'premium' to the market price. This alternative will also be examined below.

In addition, the new ABI guidelines discourage remuneration committees from permitting a second or further chance to meet the performance conditions ('re-testing') if these are not fully satisfied at the first opportunity.[5] Finally, the reward for the attainment of targets is encouraged to be on a sliding scale (where the reward or proportion of options vesting increases with the level of performance once a certain threshold is surpassed). In all of this, it should be stressed that the actual ABI guidelines nowhere prescribe the behaviour of remuneration committees. Recommendations only are given,[6] exceptions are permitted, and remuneration committees and boards are free to depart from these guidelines. This reflects the 'comply or explain' approach to governance that has been adopted in the UK. The practical reality is, however, that the ABI guidelines are adhered to very carefully.

The new ABI guidelines also place emphasis on the challenge of reporting to shareholders the expected value of such rewards. This facilitates a move away from the traditional practice of neither reporting[7] nor recognising the cost of servicing ESOs, and anticipates the introduction of the International Accounting Standards Board's (2004) IFRS 2, which requires the reporting and recognition of share-based payments as an expense. This challenge is, of course, mirrored in the difficulty of assessing the impact of the ABI guidelines on the pay-performance linkage confronting the executives being remunerated under such schemes.[8] There are sufficiently many inter-related conditions suggested by the new ABI guidelines that evaluating their performance on the pay-performance relationship using a theoretical approach would require some very strong assumptions.[9] We have, therefore, adopted a more empirical method of estimation, whereby various combinations of the guidelines are simulated on data from a given set of companies.

While some previous work in this area has focused on estimating the observed pay-performance connection in samples of companies while ignoring the institutional setting,[10] this paper takes explicit account of the influence in the process of institutions, the ABI in particular. One further unusual feature of this paper is that it uses data to shape empirical estimates of the impact of institutional rules on the pay-performance connection. Using a sample of some 101 companies[11] traded on the London Stock Market over the 1984–1997 period, the method involves adopting various particular specifications of the ABI guidelines and applying them in each company at the start of 1984 and computing the reward that the CEO would earn under each specification as events unfold through to 1997. The fortunes of such CEOs over the period are then used to study the impact of each particular variation of the ABI guidelines on the pay-performance connection.

Previous commentators have restricted themselves to more general comment or interpretation on the institutional influence. While some of these studies have highlighted important considerations, such as the taxation and dilution issues raised by Egginton et al. (1993), none has previously attempted to quantify the impact of these rules on pay-performance sensitivity.

In the following section of the paper, some background information is provided concerning the idea of performance related pay in the boardroom and the development of the ABI guidelines over the years. This is then followed by a section which explains how the empirical data are constructed and the methods used. The next section then presents an analysis of the results obtained and the paper ends by offering some policy discussion in the light of the conclusions that can be drawn from these results.

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[5] Options typically vest after three years and the performance period is usually the most recent three-year period.

[6] This is seen, for example, in the fifth paragraph of the ABI (1999) guidelines which states 'It is hoped that remuneration committees and company boards will also have regard to these principles in developing and implementing share incentive schemes.'

[7] In fact, UITF (Abstract 10) of the Accounting Standards Board (1994) does require basic option-related information to be reported in a footnote to the accounts. Reporting standards were further tightened by the Directors' Remuneration Report Regulations 2002.

[8] For earlier work examining the pay-performance relationship brought about by executive share options, see Main et al. (1996) and Yermack (1995). And for a discussion of UK policy in this area, see Conyon et al. (1995).

[9] Ball et al. (2005), Carrett and Wong (2002) and Hull and White (2004) present analytical approaches to the valuation issue.

[10] Choudhary and Orszag (2003) offer a probability-based measure of assessing whether each company's existing performance hurdles reflect tough pay-performance conditions set in place by company boards.

[11] Although we assume we are dealing with the chief executive officer (CEO), the salary data as reported on Datastream refer to that of the highest paid director.

2. Pay for performance in the boardroom and the ABI guidelines

The standard framework in which to analyse executive pay is that of agency theory. The lack of direct supervision of the chief executive officer (CEO) suggests that the board should set in place a payment mechanism that aligns the incentives or interests of the executives with the interests of the shareholders or the company at large. Fama (1980), Jensen and Meckling (1976), and Rosen (1992) are well known proponents of this principal-agent view, and recent empirical applications can be found in Core et al. (2003b) and Fenn and Liang (2001). Alternative views such as Pettigrew and McNulty (1995), based on power and influence, also exist. Empirical support for such power-based views is comprehensively summarised in Bebchuk and Fried (2004), but as Murphy's (1999:2542) recent survey of the area makes clear, 'Overall, the evidence is consistent with the hypothesis that stock based incentives are important drivers of managerial action and corporate performance.[12]' Further discussion along these lines can be found in Core et al. (2003a).

In a useful survey paper, Conyon and Sandler (2000) review the UK evidence available on the pay-performance relationship at the boardroom level. The majority of studies reviewed use a measure of CEO pay that ignores the equity component that Murphy (1999) finds to be so important. The few exceptions mentioned include Conyon and Murphy (2000) which finds a significant connection between pay and performance among UK companies – although empirically more modest than found in a similar sample of US companies (with a mean UK pay for performance sensitivity of 2.33% versus a mean in the US of 4.18%). Conyon and Sadler (2001: 260) show that 0.18% of the UK effect is due to option holdings. The UK results echo those for the US of Hall and Leibman (1988) and Aggarwal and Samwick (1999), both of which studies employ a salary plus change in value of executive share option holdings measure of CEO remuneration.

The purpose of this paper is to recognise that such theories must be interpreted within an institutional framework. Within the UK, one of the most powerful influences on that framework is the set of guidelines issued and maintained by the ABI. The hypothesis investigated here is that recent revisions of the ABI guidelines may have had the unintended consequence of inhibiting the range of pay-performance outcomes that are available to the board. This hypothesis will be investigated by utilising a sample of companies and their recent performance to analyse the impact of various configurations of the ABI guidelines on the pay-performance relationship. The aim will be to assess the extent to which the board's ability to craft a strong pay-performance relationship is conditioned by the ABI guidelines.

Before turning to a detailed discussion of the methodology deployed and the measurement issues involved, it is first useful to consider briefly the development of the ABI guidelines. In an attempt to foster the adoption of a more explicit culture of performance related pay in the boardroom,[13] the government of the day introduced the concept of 'approved share option schemes' under the Finance Act 1984. Until this point, any gains from ESOs were treated as income and taxed accordingly (up to a rather punitive top rate of 83% in early 1979). Although the top rate of income tax was reduced to 60% in 1979, the prospect held out by the Finance Act 1984 was that ESOs operating under certain restrictions could have their gains taxed as capital gains (which then faced a more attractive 30% tax rate). The principal restriction imposed by the Inland Revenue, in order to limit the tax-expenditure implications of this concession, was that the face value (the exercise price times the number of shares under option) of options issued under such schemes should be limited to four times the annual emoluments of the relevant executive.[14]

With the vast majority of ESOs being serviced through shares by subscription (newly issued shares) rather than by acquisition (open market purchase), and with shares by subscription being neither recognised nor reported in the earnings statement, institutional shareholders were alarmed at the prospect of equity dilution.[15] In drawing up a set of guidelines,[16] the ABI seems to have reached for the existing Inland Revenue Code. These ABI guidelines were almost universally adopted,[17] to the extent that it seemed to become a rule or an entitlement that all executives at board room level would be issued with options to the value of four times emoluments. The fact that such a uniform distribution of ESOs is unlikely to represent an efficient outcome in terms of providing individual executives with the appropriate incentive – a situation that is likely to vary from company to company and, indeed, executive to executive – was highlighted by Main (1994). Admittedly, some latitude was provided under revised ABI guidelines, which included provision for so-called 'super options' involving an additional four times emoluments in options, but the associated performance conditions[18] were sufficiently steep to deter most companies from deploying them.

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[12] Hall and Murphy (2003) offer a rejoinder to Bebchuk and Fried's (2004) arguments, while not denying the existence of areas where the design and implementation of executive share option programmes could be substantially improved.

[13] Performance related pay can be viewed as part of the contractual approach to corporate governance (see Shleifer and Vishny (1998) and Baker et al. (1988) for a more detailed review and discussion).

[14] There were also Inland Revenue conditions requiring a minimum three year vesting period and a maximum 10-year life. Annual emoluments are essentially defined as base pay plus bonus.

[15] This is an area that is examined by Egginton et al. (1993). One impact of the Greenbury and Hampel reports has been a reversal of this pattern and an increased propensity to use market purchases of shares to meet vesting of awards under Ltips and ESOs.

[16] The National Association of Pension Funds (1984) originally issued their own, almost identical, guidelines.

[17] Main (1993) provides a description of the organisational arrangements for pay setting in the board room, and Main (1999) discusses recent developments in the use of executive share options.

Although the intention of the ABI was always that their guidelines should be used by boards and remuneration committees to guide their remuneration policy, a succession of revisions (concerning considerations such as the entitlement to reissue options within a 10-year period if a previous tranche had been exercised) resulted in these very ABI guidelines effectively being used as the 'rules' by boards and remuneration committees. This in spite of the fact that any tax advantage gained by adhering to the original Inland Revenue conditions for approval had, to a large extent, been swept away with the Finance Act 1988, which not only reduced the top rate of income tax to 40% but harmonised high taxpayer's capital gains tax with their marginal income tax rate.[19] Only with the Greenbury Report (1995) was the pre-eminence of the ABI guidelines dented, and then only due to a movement by companies toward Ltips and away from ESOs. The ABI (1999) guidelines can be seen as an attempt to include all share-based executive incentive schemes,[20] but they also represent a marked departure from the previous implicit one-size-fits-all approach. Companies are now free to issue options at some proportion of an executive's cash pay and to do so on an annual basis. In return, however, perhaps stung by the widespread past criticisms of what are widely (but often incorrectly[21]) perceived to have been unnecessarily generous ESOs, the ABI has included some strong encouragement toward the inclusion of demanding performance criteria. These criteria are required to be relative to a peer group of companies or to some benchmark performance standard.

The following four points capture the salient aspects of the post-1999 ABI guidelines:

(i) a movement away from the traditional option scheme with its four times emoluments limit towards phased grants – on an annual or some other regular basis: ('PHASING').

(ii) the use of challenging performance criteria relative to an appropriately defined peer group or other relevant benchmark, with total shareholder return being acceptable as the primary criterion where it is supported by a defined secondary financial criterion, e.g. earnings per share. Performance criteria to demand a minimum of median level performance but with a sliding scale towards superior performance: ('RELPERF').

(iii) a single predetermined performance measurement period is encouraged and the ability to 'retest' performance over successive periods, if performance originally falls short, is discouraged: (no 'RETESTING').

(iv) while the issuing of options with a strike price at a premium to the prevailing market price is not accepted as a substitute for performance conditions, i.e. performance hurdles, it is allowed as a possibility: ('PREMIUM').

As indicated above, the new-approach guidelines also emphasise the importance of providing from the outset some notion of the expected value of the awards granted. Under the UITF(Abstract 10) guidance of the Accounting Standards Board (1994) and strengthened by the Directors' Remuneration Report Regulations 2002, the annual accounts are required to contain the basic information that might allow the calculation of such values, but the reality is that the existence of performance conditions and other restrictions ensure that only the most approximate of estimates can be made from these data. The International Accounting Standards Board rule, IFRS2, now forces this issue as of financial years beginning after 1 January 2005.

The main thrust of the ABI regulations is investor protection through avoidance of hidden liabilities in executive contracts, and an attempt to ensure that the executive earns any shares awarded. No effort is made in the UK to inhibit executives from counteracting the incentive aspects of ESOs by taking a countervailing position in the company's shares through hedging in the derivatives market, although Company Law requirements on the disclosure of contracts for difference may effectively rule out such actions. In the US,

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[18] These demanded a minimum vesting period of five years and growth in earnings per share that placed the company in the upper quartile of the FTSE-100 performance.

[19] The residual tax benefit lay in avoiding any tax until the underlying shares themselves were sold (as opposed to the options being exercised) and the tax shield provided by the annual capital gains tax allowance - something most senior executives are likely to have exhausted in any case.

[20] And, indeed, in recent years there has also been a swing back to executive share options in preference to the complexity of Ltips, although the stock market correction of 2000–01 has checked this swing.

[21] See Main et al. (1994), Conyon and Murphy (2000), and Conyon and Sadler (2005) for some comparative evidence on CEO pay.

Schizer (1999) explains the general absence of such behaviour essentially as an accidental outcome of the tax code. Bebchuk and Fried (2004) adopt a broader definition of unwinding executive incentives, including early exercise, reissue of under-water options and sale of existing equity holdings, and decide it is more prevalent than usually supposed. Boards in the UK are enjoined from reissuing options that are 'under water', although this is a practice that Samuels and Lymer (1996) documented[22] as occurring.

The key point is that the ABI guidelines have developed over the years from a perspective of guarding shareholder interests (primarily against dilution). They have, however, also been adopted as important parameters in designing executive pay packages. To some extent, this has been recognised in the recent versions of the guidelines which have an implicit value-for-money dimension to them. The question is whether any constraints in such a complex area can have the desired effect of tying pay to performance. There is a distinct possibility that the effectiveness of the board in crafting a pay-performance relationship may, in fact, be undermined by following these very rules, and it may not be immediately obvious that this will be the consequence.

The following section of the paper explains the approach adopted here to gauge the empirical impact of the guidelines sketched above on the connection between executive pay and performance. We also provide some information regarding the various measures of executive pay that can be used, and how these influence the reported pay-performance effect.

3. Method

The Risk Measurement Services (RMS) Data Archive between March 1984 and March 1997 and Datastream are used as the sources of company observations. To provide comparable data and to allow the executive portfolios of share options to accumulate, companies with a continuous availability of CEO base plus bonus payments, share price, shareholder return and earnings per share data are selected. This yields a sample of 101 companies. Due to the data requirements imposed, there will, of course, be a survivor bias in this sample and no claim can be made of the general applicability of the levels of the pay-performance connection estimated. Nevertheless, it remains useful to study the *relative* impact of the changing versions of the ABI guidelines on the pay-performance relationship in this sample.

In each case, the approach adopted is to follow the CEO[23] in each company over the entire period. Conditioned by the observed annual emoluments, the CEO is assumed to receive issues of ESOs under various combinations of the ABI guidelines. In this way, an ESO portfolio is accumulated and monitored over the period. For the first four years of the ESO scheme, portfolios simply accumulate, but thereafter it is possible to generate measures of total remuneration as the various vintages of options conditionally vest and are exercised according to the particular combination of ABI guidelines in effect. For each possible combination of guidelines, therefore, it is possible to generate 101 observations over some 10 years (1988 through 1997) in terms of the pay outcome for the executives and the respective performance of the companies involved. The pay-performance relationship that emerges can then be studied.

As one of the key considerations in the ABI guidelines is the concept of relative performance, it is also necessary to generate a performance benchmark. One possibility would have been to define a peer group for each of the companies and to measure each company's performance against its particular peer group. This, however, would introduce an additional degree of heterogeneity in an exercise that is attempting to reach some general conclusions regarding the impact of the ABI guidelines. It was, therefore, decided to use common benchmarks for two performance variables, namely, total shareholder return and growth in earnings per share. Growth in earnings per share at rpi+3% was set as a necessary condition. Total shareholder return (TSR) was used as the sufficient condition. Performance at the median and upper quartile of the FTSE-100 companies is a widely used standard[24] and this measure is available from the RMS data base. Before June 1986, however, there was no FTSE-100 marker and in its place membership of the FTA Share Index is used. But, for the majority of the time period under study, performance is measured relative to the median (for any vesting) and the upper quartile (for full vesting) of the FTSE-100.

As explained above, the main dimensions of ESO schemes examined include: the phasing of option issue ('PHASING'); the use of meaningful relative performance criteria ('RELPERF'); retesting allowed of attainment of performance hurdles ('RETESTING'); options issued at a premium to the market ('PREMIUM'). In each of these scenarios, the year-to-year valuation of the outcomes is measured and, in addition, the year-to-year variations in the executive's wealth as measured by the

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[22] It is interesting to note, in this context, that recent work by Hall and Murphy (2000, 2002) demonstrates that this can often be in the interest of both the company and the executive for such re-issues to take place. Such re-issue has become common in the US, as Pollock et al. (2002) make clear.

[23] See footnote 11.

[24] In practice, the use of the FTSE100 is becoming less popular than custom designed peer groups of comparator companies.

Table 1
Basic modes of ESO investigated

Characteristic	*Scheme version label* *A*	*B*	*C*	*D*	*E*	*F*
PHASING	No	Yes	Yes	Yes	Yes	Yes
RELPERF	No	No	Yes	Yes	Yes	Yes
RETESTING	Yes	Yes	Yes	No	Yes	No
PREMIUM	No	No	No	No	Yes	Yes

A: Base model (traditional four times emoluments every four years).
B: Phasing of option issue (one times emoluments annually).
C: Phasing of option issue (one times emoluments annually) plus Performance criteria.
D: As 'C' plus no Re-testing.
E: As 'C' plus issue at a Premium strike price (25% above market).
F: As 'C' plus no Re-testing and issue at a Premium.

Black-Scholes-Merton valuation of the ESOs is calculated.[25] The first approach presents an ex-post view of remuneration, and the second an approximate accounting valuation of the contemporaneous changes in CEO wealth over the period.

In total, there are six variations of ESO package design that are tested. These are delineated in Table 1.

There are, clearly, more than six combinations of the conditions listed in Table 1, but these combinations seem the most obvious to test in terms of the pay-performance relationships that the various conditions produce. In terms of the performance criteria, the options are assumed to be exercised after a minimum holding period of four years. This is longer than the usual official three-year vesting condition, but the complication of closed periods for director equity transactions and other institutional features suggest that this is not too far from reality.[26] When relative performance conditions apply, the vesting is dependent on the company in question attaining both: (i) at least median performance on total shareholder return; and (ii) an annual growth in earnings per share of at least that of the retail price index plus three percentage points over the previous three years. The extent of the vesting is decided on a pro-rata basis[27] with median total shareholder return earning 0% of entitlement and upper quartile earning 100%. For those circumstances in which share options are issued at a premium exercise price, the premium assumed is the current market price on the day of issue plus 25%.

A total of 101 companies[28] in the Risk Measurement Services Data Archive are found to have complete data on emoluments, share price, volatility, and earnings per share in the period 1984 through 1997. Starting in 1984 each executive is followed through 1997 and, depending on the exact set of rules in place (see Table 1), that executive's qualification for share options is monitored and her options holdings valued on a yearly basis with the appropriate exercises, lapses, and new issues duly recorded. The first four years of data are necessary to bring the executive into an 'equilibrium' state in terms of the option plans, and this leaves 10 years of data for analysis.

Four pay variables are computed. The first, labelled 'Pay1', is simply the cash pay plus any realised option gains from the executive share option holdings. Thus:

$$Pay1_t = (BasePay)_t + \sum_{j=1}^{t-4} \left(NEX_{j,t} \middle| P_t \geq SP_j\right)\left(P_t - SP_j\right) \quad (1)$$

Where,
P_t = prevailing share price at time t
SP_j = strike price of options issued at time j
$NEX_{j,t}$ = the number of share options of vintage j that are exercised in period t.

The second pay measure is more complex than the out-turn measure presented above. This second measure, labelled 'Pay2', includes all the realised and unrealised gains to the option holdings of the executive in the relevant year. This is done by using a Black-Scholes-Merton approach to place a crude market value[29] on the option holdings of the executive at each year-end in the history. As discussed above, it is recognised that, for well-known reasons, this can only be an approximation to the wealth enhancement of the executive due to ESO holdings. Most obviously, the change in wealth so measured ignores the fact that the options being valued may not have vested, that the options cannot be traded but only exercised by the nominated executive, and that there is an additional risk owing to the chance of the executive being fired or the company being taken over.[30]

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[25] The Black-Scholes-Merton valuation of executive share options has long been known to be at best a crude approximation of the value to the executives, although considerably nearer the cost to the company (see Clark and Main, 1995 and Hall and Murphy, 2002).

[26] Data on UK executive option exercise patterns is patchy, but a study in the US (Carpenter, 1998) finds an average of 5.8 years in practice.

[27] Although the actual guidelines refer to 'sliding scales between top quartile and median performance', the initial reward at the median may start at 25% of possible shares rather than 0%.

[28] Financial companies, property companies and investment trusts were excluded. The median level of sales in 1997 was £0.93b and the average was £2.86b.

[29] Hall and Murphy (2002) explain that due to risk aversion the over-invested executive is likely to place a value on options that is significantly lower than this risk-neutral market valuation.

Thus 'Pay2' can be written:

$$Pay2_t = (BasePay)_t + \sum_{j=1}^{t-1} NUM_{j,t}\left(BS_{j,t} - BS_{j,t-1}\right) \quad (2)$$

$$+\sum_{j=1}^{t-4} NEX_j\left(P_t - BS_{j,t-1} \middle| P_t \geq SP_j\right) + NUM_{t,t}\left(BS_{t,t}\right)$$

Where,

$NUM_{j,t}$ = number of shares under option of vintage j that are held at period t and not being exercised (not included in $NEX_{j,t}$). This will vary over time as some are exercised and some lapse, either due to time limitations or due to failure to attain performance-criteria hurdles that are part of the vesting requirements of the company's executive share option plan. For j = t, these are new issues. (Note that, for j ≠ t, $NUM_{j,t}$ is first reduced by $NEX_{j,t}$).

$BS_{j,t}$ = the Black-Scholes valuation of an option on the company's shares issued under the company's executive share option plan at time j and valued at time t.

A further measure of pay, 'Pay3', represents what is handed over to the executive each year in the form of cash pay and current valuation of any share options as granted in each year, and can be written:

$$Pay3_t = (BasePay)_t + NUM_{t,t}\left(BS_{t,t}\right) \quad (3)$$

The 'Pay3' measure is similar to that used by Campbell and Wasley (1999) or Hermalin and Wallace (2001), in that these authors value options only at the point of issue. (whereas 'Pay1' values options at the point of exercise). On the other hand, the 'Pay2' measure resembles that favoured by Aggarwal and Samwick (1999), Hall and Lieberman (1998) and Jensen and Murphy (1990a) in that it follows the change in value of the outstanding executive share options held by the CEO. While relying on what Wiseman and Gomez-Mejia (1998) term an 'instant endowment effect', this 'Pay2' measure is generally recognised as the more comprehensive[31] in terms of focusing on the pay-performance relationship. It is, arguably, less intuitive than the 'Pay3' measure which captures the same-period flow of asset claims. And, of course, the measure that dominates press reporting of this subject is 'Pay1', which records what the outsider sees as the executive exercises his or her share options.

Whereas all of the above three measures depend on some subsequent analysis (usually regression) to determine the effective pay-performance connection for the executives in question, a fourth measure computes this effect directly. This is done by utilising the option 'delta' (sensitivity of the market price of the option changes in the company's share price). This measure was promoted by Jensen and Murphy (1990b), and is also used by Conyon and Murphy (2000) and is discussed in Murphy (1999). The pay-performance sensitivity can be calculated (as opposed to estimated) by using the current holdings of options by the executive (expressed as a fraction of the outstanding equity of the company) multiplied by the option 'delta'. With several tranches of option, care has to be taken to sum over each distinct tranche which will have its own characteristic 'delta' at each particular point in time. Thus:

Calculated Pay-Performance sensitivity owing to options =

$$Pay4_t = \frac{\sum_{j=1}^{t-4}\left[(NUM)_{j,t}\dfrac{\partial BS_{j,t}}{\partial P_t}\right]}{[Number\ of\ Shares\ Outstanding]} \quad (4)$$

Where,

$\frac{\partial BS_{j,t}}{\partial P_t}$ is the option 'delta' for vintage j and time t

Table 2 provides some descriptive statistics pertaining to the data used (data based on 1988–1997).

4. Analysis of results

The impact of the various designs of option scheme (labelled model A through model F, corresponding to the columns in Table 1) on the annual pay outcomes is shown in Table 3 for the median and mean outcomes. It can be seen that, for 'Pay3', versions B, C and D are equivalent, as 'Pay3' measures the cost of issuing the options and no allowance is made in this calculation for the subsequent impact of performance hurdles or re-testing

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[30] This is a much overstated problem as, in reality, most executives in a change of control situation or even in a loss of job situation (e.g., if deemed a 'good leaver') are allowed to exercise their outstanding options - often earlier than the original vesting requirements.

[31] Bertrand and Mullainathan (2001:905) refer to it in the following terms: 'Ideally, the compensation measure in a given year would also include changes in the value of unexercised options granted in previous years.'

Table 2
Variables used in regressions

Variable name	*Mean*	*Lower quartile*	*Median*	*Upper quartile*	*St. Dev.*
Cash pay	£327,224	£150,000	£234,500	£393,000	£280,809
'Pay 1'	£454,365	£181,000	£304,500	£525,000	£464,359
'Pay 2'	£472,277	£163,581	£313,103	£584,060	£525,094
'Pay 3'	£428,015	£190,210	£299,768	£518,177	£390,185
Employees	23200	3238	9663	27720	31492
Total shareholder return	0.1279	–0.357	0.1184	0.2564	0.2433

Table 3a
Median annual pay outcomes

Median pay	*'Pay 1'*	*'Pay 2'*	*'Pay 3'*
Model A	£304,500	£313,103	£299,768
Model B	£298,905	£307,619	£294,572
Model C	£263,834	£307,184	£294,572
Model D	£257,000	£261,444	£294,572
Model E	£259,000	£281,686	£277,641
Model F	£254,000	£250,910	£277,641

Table 3b
Mean annual pay outcomes

Average pay	*'Pay 1'*	*'Pay 2'*	*'Pay 3'*
Model A	£454,365	£472,277	£428,015
Model B	£423,822	£446,764	£407,244
Model C	£406,681	£480,390	£407,244
Model D	£363,572	£386,045	£407,244
Model E	£389,656	£435,584	£382,226
Model F	£355,445	£357,255	£382,226

conditions. In version E and F, of course, the presence of premium exercise prices on the options is taken into account at the point of option grant.

Table 4 reports the results obtained by regressing each pay measure on company performance (measured by TSR), controlling for company size (as measured by employment). This specification in equation (5) follows Conyon (2000:5):

$$Ln(Pay)_{i,t} = \alpha_i + \beta_1 Ln(Pay)_{i,t-1} + \beta_2 Ln(E)_{i,t} \quad (5)$$
$$+ \beta_3 (TSR)_{i,t} + \xi_t + \varepsilon_{i,t}$$

Where,

$Pay_{i,t}$ = the observed pay variable for company i in year t

$E_{i,t}$ = employment in company i in year t

$TSR_{i,t}$ = Total shareholder return for company i in year t

This equation can be estimated in first differences, following Arellano and Bond (1991) which allows for both the panel and dynamic effects present.[32] Table 4 contains the regression results for each of three pay measures under the various arrangements of the ABI guidelines being considered.

Table 4c reports the estimates that are closest to those of Conyon (2000:11), as the 'Pay3' variable involves cash pay and the value of options as granted (Conyon's is also a current-period pay measure, although involving only cash pay). The coefficients on the size variable (employment) are similar, giving a pay-size elasticity of around 0.23 to 0.30. The coefficient on the performance variable is only significant in the case of model A, which has the more 'lumpy' (no phasing) issue of

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[32] One complicating factor of the use of logs is that with the measure Pay 2 it is possible to have negative values. To avoid this complication, this distribution is Winsorised with a lower 'Pay2' value of £50. The results are not sensitive to this choice.

Table 4a
Regression results for dependent variable Pay 1

	Dependent variable: 'Pay1' (options valued at exercise)					
	Model A	*Model B*	*Model C*	*Model D*	*Model E*	*Model F*
Lagged DV	0.1708	0.6546	0.3134	0.5059	0.3277	0.4919
	(0.0435)	(0.0659)	(0.0588)	(0.0630)	(0.0577)	(0.061)
Log employees	0.0042	0.0484	0.2893	0.1571	0.2618	0.1482
	(0.0928)	(0.0756)	(0.0962)	(0.0766)	(0.0852)	(0.0751)
Total shareholder return	0.3819	0.3349	0.2703	0.1882	0.2467	0.1633
	(0.0758)	(0.0725)	(0.0946)	(0.0787)	(0.0892)	(0.0741)
Serial correlation S1	–6.65	–5.35	–6.75	–6.12	–6.58	–5.97
(prob value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Serial correlation S2	–1.47	–0.15	0.29	–0.34	0.08	–0.38
(prob value)	(0.14)	(0.88)	(0.77)	(0.74)	(0.94)	(0.70)
Wald-test on above 3 variables	140.08	77.51	31.30	34.04	30.17	32.50
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Wald-test on time dummies	41.05	124.95	42.56	70.25	46.60	70.67
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)

Notes: S1 and S2 are first and second order serial correlation tests respectively. Robust estimation. One-step results.
Standard errors in parentheses.

Table 4b
Regression results for dependent variable Pay 2

	Dependent variable: 'Pay2' (change in option value)					
	Model A	*Model B*	*Model C*	*Model D*	*Model E*	*Model F*
Lagged DV	0.0359	0.0103	–0.0705	0.0592	–0.0711	0.0373
	(0.0574)	(0.0207)	(0.0463)	(0.0164)	(0.0499)	(0.0210)
Log employees	0.5598	0.1576	–0.0308	0.1825	–0.2088	0.0507
	(0.3024)	(0.2210)	(0.5677)	(0.4034)	(0.5668)	(0.2338)
Total shareholder return	3.2277	2.1750	3.6549	2.4912	3.0955	2.0249
	(0.4875)	(0.2718)	(0.3232)	(0.3289)	(0.4396)	(0.3042)
Serial correlation S1	–3.94	–2.59	–5.19	–3.980	–4.75	–2.95
(prob value)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Serial correlation S2	–1.46	–0.31	–0.13	1.12	–0.35	0.74
(prob value)	(0.14)	(0.75)	(0.89)	(0.26)	(0.72)	(0.46)
Wald-test on above 3 variables	37.05	29.35	28.06	29.79	28.37	31.25
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Wald-test on time dummies	49.83	95.74	61.72	96.94	50.55	64.49
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Notes: S1 and S2 are first and second order serial correlation tests respectively. Robust estimation. One-step results.
Standard errors in parentheses.

Table 4c
Regression results for dependent variable Pay 3

	Dependent variable: 'Pay3' (options valued at issue)					
	Model A	*Model B*	*Model C*	*Model D*	*Model E*	*Model F*
Lagged DV	0.0773 (0.0589)	0.3295 (0.0781)	0.3295 (0.0781)	0.3295 (0.0781)	0.3264 (0.0783)	0.3264 (0.0783)
Log employees	0.2965 (0.1131)	0.2254 (0.0791)	0.2254 (0.0791)	0.2254 (0.0791)	0.2258 (0.0794)	0.2258 (0.0794)
Total shareholder return	0.2012 (0.0715)	0.0375 (0.0510)	0.0375 (0.0510)	0.0375 (0.0510)	0.0304 (0.0508)	0.0304 (0.0508)
Serial correlation S1 (prob value)	–6.16 (0.00)	–5.02 (0.00)	–5.02 (0.00)	–5.02 (0.00)	–5.03 (0.00)	–5.03 (0.00)
Serial correlation S2 (prob value)	–1.20 (0.23)	–0.32 (0.75)	–0.32 (0.75)	–0.32 (0.75)	–0.34 (0.73)	–0.34 (0.73)
Wald-test on above 3 variables	80.92 (0.00)	40.36 (0.00)	40.36 (0.00)	40.36 (0.00)	38.88 (0.00)	38.88 (0.00)
Wald-test on time dummies	19.88 (0.00)	34.24 (0.00)	34.24 (0.00)	34.24 (0.00)	33.86 (0.00)	33.86 (0.00)

S1 and S2 are first and second order serial correlation tests respectively. Robust estimation. One-step results.
Note: Equations for models B,C and D are identical. So too are models E and F. Standard errors in parentheses.

options. In the cases of 'Pay1' (Table 4a) and 'Pay2' (Table 4b), the pay measures are more noisy, depending, as they do, on outcomes tied to company performance (the fluctuations of the value of options exercised in the case of 'Pay1', and the value of the options portfolio in the case of 'Pay2'). In both the 'Pay1' and 'Pay2' cases, however, the statistical significance and size of the performance variable coefficients (TSR) are both greater than with the value of the options at time of issue, as captured in the 'Pay3' measure. And, in the case of 'Pay2', the empirical size is much greater.

For each pay measure, 'Pay1' and 'Pay2', Table 5 tests the estimated coefficients on the performance variable to establish significant differences among versions of the ABI guidelines (A through F). The 'Pay3' measure is ignored here as the estimated coefficients on the performance measure are too weak. The rows of Table 5 pertain to the equation in which the testing of the coefficient size is performed and row header gives the size of the coefficient as estimated in that equation. The columns of Table 5 give the hypothesised size of the coefficient being tested and the equation (model type) from which it comes. In Table 5a, it appears that for the 'Pay1' measure the performance coefficient of models A and B are significantly larger than those in model D and F. Models D and F are distinguished by utilising options with no re-testing provision. Issuing options with a strike price set at a (25%) premium to the prevailing market price at time of issue (model E) seems less important as long as re-testing is allowed.

Table 5b which reports Wald tests on the return coefficients in the 'Pay2' regressions, indicates that model A and model C are significantly higher than models B, D and F. Model E is significantly higher than models B and F but not D. The key implication of this finding seems to be that relative performance standards seem, if anything, to improve the pay-performance relationship. This may owe to the relative performance test inhibiting the early, and relatively unprofitable, exercise of options. With models D and F, the withdrawal of the possibility of re-testing against the performance conditions seems to weaken the pay-performance relationship.

Before ending this examination of the pay-performance relationship, it is interesting to reflect on the very different size of effect one gets by moving from a measure such as 'Pay1', which measures option gains as they are exercised, to 'Pay2', which measures the year-to-year influence on the executive's portfolio value brought about by fluctuations in company performance. The Wald tests reported in Table 6 suggest that the 'Pay2' measure reveals a significantly much larger pay-performance measure than 'Pay1', and both of these dominate the 'Pay3' measure. But it is the 'Pay2' measure that stands out. This difference may be a material consideration for remuneration committees wishing to communicate effectively with shareholders as to the extent to which an executive's pay is tied to company performance.

The final pay-performance measure to be con-

Table 5a
Wald-test results for equality of Total Shareholder Return (TSR) coefficient across Pay 1 equations

Equation in which test conducted [estimated coefficient value]	*Pay 1 Wald-tests (probable value)*					
		Source of coefficient value [and value] being tested				
	Model A [0.3819]	*Model B* [0.3349]	*Model C* [0.2701]	*Model D* [0.1882]	*Model E* [0.2467]	*Model F* [0.1633]
Model A [0.3819]	0.00	0.038	2.17	6.53	3.18	8.32
	(1.00)	(0.54)	(0.14)	(0.01)	(0.07)	(0.00)
Model B [0.3349]	0.42	0.00	0.79	40.90	1.48	5.60
	(0.52)	(1.00)	(0.37)	(0.04)	(0.22)	(0.02)
Model C [0.2701]	1.39	0.47	0.00	0.75	0.06	1.28
	(0.24)	(0.49)	(1.00)	(0.39)	(0.80)	(0.26)
Model D [0.1882]	6.06	3.48	1.09	0.00	0.55	0.10
	(0.01)	(0.06)	(0.30)	(1.00)	(0.46)	(0.75)
Model E [0.2467]	2.30	0.98	0.07	0.43	0.00	0.87
	(0.13)	(0.32)	(0.79)	(0.51)	(1.00)	(0.35)
Model F [0.1633]	8.72	5.37	2.09	0.11	1.27	0.00
	(0.00)	(0.02)	(0.15)	(0.74)	(0.26)	(1.00)

Table 5b
Wald-test results for equality of Total Shareholder Return (TSR) coefficient across Pay 2 equations

Equation in which test conducted [estimated coefficient value]	*Pay 2 Wald-tests (probable value)*					
		Source of coefficient value [and value] being tested				
	Model A [3.2277]	*Model B* [2.1750]	*Model C* [3.6549]	*Model D* [2.4912]	*Model E* [3.0955]	*Model F* [2.0249]
Model A [3.2277]	0.00	4.66	0.77	2.28	0.07	6.09
	(1.00)	(0.03)	(0.38)	(0.13)	(0.78)	(0.01)
Model B [2.1750]	14.99	0.00	29.63	1.35	11.46	0.31
	(0.00)	(1.00)	(0.00)	(0.24)	(0.00)	(0.58)
Model C [3.6549]	0.83	10.01	0.00	6.19	1.43	12.15
	(0.36)	(0.00)	(1.00)	(0.01)	(0.23)	(0.00)
Model D [2.4912]	5.02	0.92	12.52	0.00	3.38	2.01
	(0.03)	(0.34)	(0.00)	(1.00)	(0.16)	(0.16)
Model E [3.0955]	0.09	4.38	1.62	1.89	0.00	5.93
	(0.76)	(0.04)	(0.20)	(0.17)	(1.00)	(0.01)
Model F [2.0249]	15.64	0.24	28.72	2.35	12.39	0.00
	(0.00)	(0.62)	(0.00)	(0.13)	(0.00)	(1.00)

Table 6
Wald-test results for equality of Total Shareholder Return (TSR) coefficient across pay measures

	Wald-tests on equality of return coefficient within models but across pay measures (probable value)					
	Model A	*Model B*	*Model C*	*Model D*	*Model E*	*Model F*
Tests conducted in the 'Pay1' equation						
'Pay1' = 'Pay2'	1410.80	643.88	1280.75	856.59	1020.69	1684.45
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
'Pay1' = 'Pay3'	5.69	16.82	6.06	3.67	5.88	3.22
	(0.02)	(0.00)	(0.01)	(0.06)	(0.02)	(0.07)
Tests conducted in the 'Pay2' equation						
'Pay2' = 'Pay1'	34.08	45.82	52.38	49.04	42.00	37.46
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
'Pay2' = 'Pay3'	38.55	61.83	59.84	55.67	48.62	43.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tests conducted in the 'Pay3' equation						
'Pay3' = 'Pay1'	6.39	33.96	20.81	8.72	18.16	6.85
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
'Pay3' = 'Pay2'	1790.81	1754.33	5024.46	2311.75	3645.63	1543.66
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

sidered is 'Pay4', which reflects the effective proportion of the total company equity which the executive's holding of share options produces. Table 7 reports the summary statistics for this measure under the various models. In a sample of some 510 UK companies for 1997, Conyon and Sadler (2001:260) report an average value of this measure for options of 0.18%. The median values reported by Conyon and Sadler (2001) ranged from 0.02% for very large companies to 0.16% for smaller companies. These values seem dimensionally consistent with those reported in Table 7. Recall that the 'Pay4' measure under discussion here uses the Black-Scholes option 'delta' to compute the effective equity holding. This 'delta' makes no allowance for differences in performance hurdles between the models. The measure is, however, sensitive to differences in terms of the number of options held and their strike price. And, indeed, scrutiny of Table 7 reveals a, by now, familiar picture, in that models A, C and E stand out as having larger pay-performance effects.[33] The message is that relative performance hurdles can improve the pay-performance relationship as long as re-testing is allowed (which facilitates the retention of options that would otherwise be forfeited).

In the context of reporting expected (and, indeed, out-turn) values of executive share option schemes, it is interesting to recall the results presented in Table 3b, which demonstrate that the average costs of these schemes varies relatively little over models B, C and E. Whether measured by the 'Pay1' or the 'Pay2' measure the average cost of these schemes is quite similar. By restricting re-testing (models D and F), the overall costs can be reduced. But, in these latter two cases, the pay-performance relationship is seriously weakened. In a similar vein, it is interesting to note that issuing options at a premium (or 25% to prevailing market price in the case of model F) reduces costs, but also reduces the strength of the pay-performance relationship.

5. Conclusions and policy implications

While agency theory has been the traditional lens through which to regard the activities of the board and the remuneration committee, it can be argued that failure to recognise the complex environment in which these institutional structures operate can produce an 'undersocialised' (Granovetter, 1985) view of the world. It can be useful to recognise that a key concern in devising the norms and rules that define such administrative arrangements can be the desire to gain legitimacy, and through legitimacy to reduce uncertainty and hence improve resource access and chances of survival as an organisation (DiMaggio and Powell, 1983). From a resource dependency view (Pfeffer, 1972), legitimacy is in itself a resource that improves the organisations power in exchange relationships with its environment. But, equally, from an institutionalist perspective (Scott, 1995) legitimacy is a condition to be achieved, primarily through a process of imitation that reflects a consonance with the

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[33] Pair-wise t-test show that the means are all significantly different from each other.

Table 7
Pay 4 measure (%) for various executive share options plans

	Mean	*Lower quartile*	*Median*	*Upper quartile*	*St. Dev.*
Model A	0.1705	0.0540	0.1163	0.2307	0.1684
Model B	0.1545	0.0451	0.1067	0.2167	0.1512
Model C	0.2344	0.0660	0.1574	0.3254	0.2280
Model D	0.1492	0.0449	0.1054	0.2096	0.1451
Model E	0.1923	0.0548	0.1312	0.2694	0.1918
Model F	0.1205	0.0345	0.0831	0.1671	0.1219

prevailing rules, law, and norms.

From the perspective of the remuneration committee, challenged with determining the remuneration package of the senior executives of the company, one answer to the uncertainty which surrounds this decision is to seek legitimacy by doing what others do. The lead offered by the ABI guidelines then provides a co-ordinating mechanism that all can follow, hence bringing about a remarkable institutional isomorphism.

Executive pay packages are, in fact, far more similar than one might expect. The adherence to the original four-times emoluments rule and now the revised post-1999 guidelines has led to a more ordered pay environment than might otherwise be expected. To see this, one only has to consider the remarkable divergence in top pay packages between the US and the UK. In two systems commonly bracketed together in discussions of corporate governance, the resulting use of ESOs is markedly different. Conyon and Murphy (2000, p655) report the median executive in their US sample holding proportionately 6.5 times more options than the UK equivalent (0.72% versus 0.11%). Even controlling for size, the ratio was 6.7 times (0.94% versus 0.14% in the £200–£500m sales range). One obvious explanation of these differences is the institutional environment. There seems little doubt that bodies such as the ABI are a major presence in the institutional environment and their influence should be taken seriously.

This paper has detailed several aspects of the influence of the ABI guidelines in conditioning what remuneration committees offer by way of executive share options. There are many motivations underlying the ABI guidelines and we have focused on but one of them, namely the impact on the pay-performance relationship between the executive and the firm. What emerges in the results discussed above is that additional constraints, which attempt to raise the performance standard by raising the hurdle, may indeed succeed in enhancing the pay-performance connection. It is, however, possible to be overly restrictive – resulting in a hurdle that is set so high that few get over it, with the consequence that the connection between pay and performance is actually diminished (for example, model D or model F with no re-testing versus model C).

In terms of effective communication with shareholders and other stakeholders, very different results are obtained with remuneration measure 'Pay2' versus the measures 'Pay1' or 'Pay3'. This serves to emphasise the advantage of portraying the impact of pay-performance devices in a contemporaneous way, particularly a contemporaneous way as seen from the perspective of the executive. Of course, many of the 'paper' gains made and subsequently lost on an executive's options portfolio may well be discounted against this eventuality in the eyes of the executive. But the important thing is to offer an alternative perspective from either the narrow ex-post out-turn view of option gains when realised (as included in the simple 'Pay1' measure) or the view of the value of the options when granted (as represented in 'Pay3'). While 'Pay1' is a particularly commonly used measure, it emphasises winners but fails to capture the ups and downs of executive share option holdings. These option holdings are far from a one-way bet when seen as representing an executive's foregone or deferred remuneration.

Use of an evolving Black-Scholes method of valuing the executive's portfolio of share options, as in 'Pay2', produces a clear and timely result. Waiting to record the actual exercise of options and the realised gains, as in 'Pay1', recognises the same transfer of wealth from the shareholders to the executive, but it is portrayed in a way whereby the timing obscures the true nature of the relationship.[34]

From a policy perspective, it might be useful if the ABI and other involved parties could recommend boards and remuneration committees to set performance conditions that are neither too easy nor to tough to achieve. Excessive severity in management incentive schemes is in no-one's interest. Furthermore, where performance conditions are set, they should possibly be tempered with a measure of generosity in terms of re-testing.

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[34] On the other hand, as the ABI guidelines (2005, Appendix 2, Note 2) recognise, the existence of performance hurdles and re-testing restrictions complicates the expected valuation of option grants, although the recognition that the matter is 'often complex', present in the 2004 version, has been removed.

The Directors' Remuneration Report Regulations 2002 allow shareholders to have a vote on the remuneration report.[35] As can be seen from the calculations above, such an arrangement calls for a considerable amount of elucidation of the likely characteristics of the recommended remuneration policy. Above all, these circumstances will reward a considerable measure of simplicity and transparency in the design of the remuneration scheme.

Finally, for boards and remuneration committees, the challenges are high and getting higher, but so too are the stakes. Increasing company performance through designing executive remuneration packages may seem a rather indirect approach, but for the non-executive members on the board it may offer the most effective route in the face of bounded rationality and informational asymmetry. Earlier work in this area by Conyon and Murphy (2000), Conyon and Sadler (2000), Gregg et al. (1993) and Main et al. (1996) has concentrated on the size of the pay-performance connection achieved through the design of CEO remuneration packages. But recent work by Hall and Murphy (2002) and Skovoroda et al. (2004) has underlined the importance of ensuring that the design of such remuneration packages reflect the individual circumstances of the CEO and the company in question. The analysis of the ABI guidelines presented above illustrates that overly restrictive codification of the pay-design process can inhibit the scope of remuneration committees in their attempt to attain this refined alignment of incentives.

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[35] See DTI Press Release on 19 October 2001.

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The determinants of the UK Big Firm premium

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Abstract—Our study attempts to determine whether, and if so why, the large auditing firms are able to earn a premium on their audit work in the UK. We start by confirming the apparent existence of a Big Firm premium during the period 1985–2002. We examine industry specialisation, non-audit service fee and monopoly pricing explanations for the premium. The results of our tests of industry specialisation are mixed. There is little evidence that this premium is associated with industry specialisation when specialists are defined at the national level. Significant premia are observed if specialisation is defined at the city level, particularly if the auditor is the industry leader. However, when appropriate allowance is made for endogeneity, by modelling both audit and non-audit fees in a simultaneous equations framework, the Big Firm premium disappears. We find evidence to suggest that non-audit fees earned by auditors from their audit clients are positively related to the size of the audit fee and vice versa. Finally, when the sample is stratified by the size of audit client, we find no systematic evidence of anti-competitive pricing.

1. Introduction

A series of mergers and takeovers have radically changed the market for professional accounting services over the last 20 years. There were eight international UK firms in 1985 (Arthur Andersen, Arthur Young, Coopers and Lybrand, Ernst and Whinney, Deloitte Haskins and Sells, Peat Marwick, Price Waterhouse and Touche Ross). In 1986, Peat Marwick merged with KMG Thompson McLintock to form the firm that is known today as KPMG. The UK mergers in 1989 between Ernst and Whinney and Arthur Young and in 1990 between Deloitte, Haskins and Sells and Coopers and Lybrand (Touche Ross in the US) reduced the number of dominant firms to six. The merger between Price Waterhouse and Coopers and Lybrand in 1997 cut this number to five. Following the Enron debacle, the loss of Andersen resulted in four Big Firms. Although these structural changes have contributed to increased concentration ratios in the audit market (Wolk et al., 2001), the effect on audit fees is unclear.

Several studies have provided evidence of the existence of a Big Firm audit fee premium in the US, Australia, Hong Kong and Malaysia.[1] However, the UK evidence is mixed. Studies by Taffler and Ramalinggam (1982), Chan et al. (1993), Pong and Whittington (1994) and Ezzamel et al. (1996) find the premium is significant, whereas Brinn et al. (1994), O'Sullivan (1998) and Ezzamel et al. (2002) do not. The purposes of the present study are twofold. One is to model the pricing of accounting services over a longer period (1985–2002) than in previous studies, one that encompasses notable contractions in the number of Big Firms. The other is to provide a systematic examination of the factors that might lead to higher audit fees being charged by Big Firms.

Our initial results are consistent with much earlier research in finding that Big Firms appear to earn a premium in the UK when due allowance is made for factors like the size, complexity and riskiness of a client's business. We also find evidence to suggest that the Big Firm premium is statistically significant from 1986 to 1998 but seems to fall away afterwards. The reasons for the decline are unclear.

One possibility is that the Big Firm premium is attributable to large audit firms devoting resources

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[1] US studies include Palmrose (1986a,b); Francis and Simon (1987); Baber et al. (1987); Simon and Francis (1988); Turpen (1990); Beatty (1993); and Ward et al. (1994). Work dealing with Australia has been done by Francis (1984), Francis and Stokes (1986); and Butterworth and Houghton (1995). For similar findings covering Hong Kong and Malaysia, see Simon et al. (1992) and DeFond et al. (2000). An overall assessment of the international audit pricing literature is provided by Moizer (1997).

to developing industry expertise, making them better auditors in the industries in question. We explore this possibility much more exhaustively than in earlier studies, measuring industry specialisation in a variety of ways and find that the results are mixed. If specialisation is defined at the national level, we find that the Big Firm premium generally remains intact. Recent studies document that the industry leaders or industry specialists defined at the city-level enjoy a fee premium over other firms (DeFond et al., 2000; Ferguson et al., 2003; Francis et al., 2005). Using these definitions, we find evidence to suggest that the Big Firm premium could be attributable to industry specialisation by auditors.

Another possibility we consider is that the Big Firm premium arises from big accounting firms being able to retain knowledge spillovers they obtain from providing consulting services to clients. We find that when income from non-audit services (NAS) provided to the audit client is included in the audit fee model, the coefficient on NAS is significant but the Big Firm premium seems to disappear. However, the picture changes when allowance is made for the possible endogeneity of audit and NAS by modelling both sources of audit firm revenue in a simultaneous equations framework. Whisenant et al. (2003) apart, prior research has not explicitly addressed this endogeneity issue. When allowance is made for endogeneity, we find that NAS is an increasing function of the audit fee and that audit fee is also increasing in NAS. From this we conclude that the audit and NAS fees could be jointly determined in a way that enhances the returns of audit firms: Big Firms appear to charge a premium for their audit services as a result of the 'one-stop shopping' they provide.

Finally, we carry out a number of additional tests to try to throw light on the competitiveness of the UK audit market. Following several high profile mergers, the Big Firms have increased their share of the audit market. Market concentration is particularly high for companies of above-average size, possibly because large audit firms have a technological advantage in auditing large clients. This raises the possibility that the Big Firm premium might be attributable to tacit or non-tacit price collusion in this segment (Sullivan, 2002). We examine the level of competition in the UK audit market by testing whether the size of the Big Firm premium differs across four sub-samples of clients stratified by size. Although the results indicate that accounting firms do not systematically engage in anticompetitive pricing, the Big Firm premium appears to be more prevalent for the lower size quartiles than the upper size quartiles. This result suggests that competition is strong in the market for prestigious clients, but smaller companies must pay a premium to secure the services of a quality-differentiated firm.

The remainder of this study of the determinants of the Big Firm premium is organised in the following manner. Section 2 summarises the research, theoretical and methodological issues relating to quality differentiated audits. We address industry specialisation in Section 3, non-audit services in Section 4 and monopoly pricing in Section 5. Our empirical results are reported in Section 6. A summary and our conclusions are presented in the final section.

2. Quality-differentiated audits

We begin our analysis of what constitutes the assumed Big Firm premium by considering quality differentiation. The three interrelated sources of demand for quality-differentiated audits are agency demand, information demand and insurance demand (Beattie and Fearnley, 1995). Agency demand, first detailed by Jensen and Meckling (1976), explains the demand for an audit in terms of a bonding mechanism that reduces the agency costs, such as the over-consumption of perks, that result from the self-interested actions of agents. The information demand addresses the circumstances when management might seek to use particularly creditable auditors in order to signal their own honesty and integrity (Dopuch and Simunic, 1980). The insurance demand for an audit refers to the avenue an audit opens up for investors and creditors to seek redress from the auditor for any losses they might suffer as a result of audit failures, with higher quality auditors having more insurance capacity. Differences in client circumstances lead to a demand for quality-differentiated audits.

The supply of quality-differentiated audits can be motivated by the theory of product differentiation (Simunic and Stein, 1987). Firms with greater expertise, credibility and audit quality will gain market share by 'word of mouth' advertising (Mercer, 1992; Rogerson, 1983). Consumers use the quality of an earlier product as an indicator of present and future quality (Mercer, 1992; Shapiro, 1983). Firms have no incentive to reduce quality if consumers quickly become aware of the degradation of the product. Audits pose practical problems for the product differentiation theory because of the difficulties of discerning product quality. Audit quality is likely to be judged on the basis of observable supplier characteristics, such as the firm's size and name (Dopuch and Simunic, 1980). Reputable firms will produce high quality audits because consumers recognise and reward the investment (Klein and Leffler, 1981; Palmrose, 1986a)[2] unless the costs of such investments are the same for both high-quality and low-quality auditors, resulting in a 'market for lemons' (Akerlof, 1970). The sheer scale of reputational investments can serve as a costly signal that might prevent such a pooling equilibrium. Rents can arise due to auditor start up costs and client switching costs and these serve as a 'bond' on independence and audit quality (Francis and Wilson, 1988). Reputable firms have more incentives to produce quality audits and maintain independence because they have large market shares (Craswell and Taylor, 1991) and the most specialised intangible assets at risk (Ritson et al., 1997), and they are able to extract economic rents as a result (DeAngelo, 1981).

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[2] Some examples of such investments include Price Waterhouse's Blue Chip Portfolio, the Coopers & Lybrand Audit Support System (CLASS), KPMG's Audit 2000 and Ernst & Young's Audit Innovation.

Most audit pricing studies estimate cross-sectional models using a small sample of data. We test for quality differentiation (model 1) over a wider time frame than in previous studies and use the panel data method that captures the time-series aspect of our data and can help reduce multicollinearity, as well as control for omitted variables (Hsaio, 1986).[3] We test whether the possession of a Big Firm brand name is a source of enhanced revenue in the audit market using the following generic model:

$$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \varepsilon. \qquad (1)$$

The dependent variable, LAF, is the natural logarithm of audit fees and the experimental (test) variable, Brand, is an indicator variable set equal to one if the auditor is a Big Firm and zero otherwise. Controls are a vector of proxies for client size (assets or revenue), litigation risk (long term debt to assets, return on investment, current and quick ratios), complexity (domestic and foreign subsidiaries ratios) and the opportunity cost of audit labour (whether the financial year end falls in the busy period). These control variables have been used in other studies to capture the majority of the work-related variation in audit fees (e.g. Francis, 1984; Francis and Stokes, 1986; Palmrose, 1986; Francis and Simon, 1987; Simon and Francis, 1988; Simon et al., 1992; Anderson and Zeghal, 1994; Brinn et al., 1994; Craswell et al., 1995; DeFond et al., 2000; Ferguson and Stokes, 2002; Ferguson et al., 2003). Based on that prior literature, we expect all these control variables to be positively associated with audit fees, with the exception of two risk proxies (Current Ratio and Return on Investment).

3. Industry specialisation

The Big Firm premium might also be explained by returns to industry specialist reputations. Audit firms promote themselves as industry specialists (Zeff and Fossum, 1967; Rhode et al., 1974; Danos and Eichenseher, 1981, 1982; Eichenseher and Danos, 1981), using the popular press and their websites to advertise their expertise in specific industries and to claim to provide a higher quality service and greater value (Berton, 1995; Dunn et al. 2000). DeAngelo (1981) defines quality as the auditor's ability to 'discover errors or breaches in the accounting system and withstand client pressures to disclose selectively in the event a breach is discovered'. The quality differentiation claims made by the Big Firms can be viewed using agency and costly contracting theories (Jensen and Meckling, 1976 and Watts and Zimmerman, 1983, 1986) as service differentials that give rise to returns to brand name and industry specialisation reputations. To the extent that their clients' control systems and financial statements are industry specific, industry specialisation could lead to higher levels of audit performance and expertise beyond the generic level mandated by statute (Shockley and Holt, 1983; Palmrose, 1984; Bonner and Lewis, 1990; Ashton, 1991). Accounting firms might expect positive returns to their investment in specialisation (Craswell et al., 1995) if audit clients benefit from significant reductions in the aforementioned industry-specific agency costs.

Theory about the influence of industry specialisation on audit fees is inconclusive. Audit firms will only develop an industry specialist reputation if it increases the credibility of financial reporting and attracts clients. Industry specialisation might do this if it creates knowledge of industry-specific audit risks that can be used on different audit assignments in the industry. The specialist knowledge could introduce production economies of scale into the audit process (O'Keefe et al., 1994), transforming the auditors involved into more efficient, lower-cost producers of audits (Eichenseher and Danos, 1981; Danos and Eichenseher, 1986; and Craswell et al., 1995). The resulting production economies of scale are passed on to clients if competitive pressures are such as to induce the industry specialists to charge lower relative audit fees (Palmrose, 1986a). The economies-of-scale argument could be strongest in the case of medium-sized audit firms if there is a clientele that demands the lowest priced audit available and if medium-sized firms are lower-cost service providers. Medium-sized firms might choose to specialise in order to generate economies of scale that will provide them with a cost advantage in this market sector and enable them to charge lower fees and gain market share (DeFond et al., 2000). This ambiguity could explain why prior research has been inconclusive (Krishnan and Yang, 1998).

Although empirical studies estimate the significance of brand name and industry-specialist returns, the design of appropriate tests for industry specialisation is fraught with difficulty, little or no attention has been paid to industry size and the theoretical rationalisation is undeveloped. Industry specialist expertise is generated when a key individual, a group of people of differing ranks or a set of audit partners focus their training and experiences in the field of interest and invest significant resources in the study of legal regulations, production processes and market behaviour of key players. Audit firms will invest resources in the creation of an industry specialist reputation if there are sufficient clients willing to pay higher fees that will cover this additional investment. It could be uneconomical for any auditor to develop expertise in small sectors, whereas several firms might find it worthwhile to specialise in large sectors. Recent research suggests that industry expertise could be developed at the city level rather than on a national scale (Ferguson et al., 2003)[4] and that the industry leader might earn a fee premium over other firms (DeFond et al., 2000; Francis et al., 2005). We build our research design on the notion that industry size matters and partition across industry sectors before defining both city-based and national-level specialists.

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[3] One audit pricing study that has used the panel data method is the analysis of the determinants of audit lags by Henderson and Kaplan (2000). We thank an anonymous reviewer for raising this issue.

Most prior studies test for specialisation as a differentiating feature *between* auditors[5] using a simple measure of specialisation derived from the audit firm's share of the market in a particular industry (Pearson and Trompeter, 1994; Craswell et al., 1995; Palmrose, 1986a; Craswell and Taylor, 1991). However, a single market-based measure of industry specialisation does not provide for a robust test and introduces a bias towards large accounting firms (Krishnan, 2001). Australian studies report both significant (Craswell et al., 1995) and insignificant industry-specialist returns (Ferguson and Stokes, 2002). US writers find that industry specialisation does not have a significant effect on audit fees (Palmrose, 1986a; Pearson and Trompeter, 1994). In Hong Kong, industry specialisation has a significant positive impact on the fees charged by the international accounting firms but a significant negative impact on the fees charged by their smaller counterparts (DeFond et al., 2000). These disparate results reflect the inconclusive state of theory, differences in auditing regimes in different countries, unusual descriptive statistics[6] and different research methodologies.

We address some of these measurement issues with design enhancements. We test whether the Big Firm premium could be explained by returns to industry specialist reputations by capturing investment in industry specialist expertise using multiple measures of the auditor's share of the sales revenue and audit fees of clients in an industry (Krishnan and Yang, 1998). We do this in a number of ways.

First, to facilitate comparison with prior work, we follow Craswell et al. (1995) and DeFond et al. (2000) and define specialists in terms of a dichotomous measure of the auditor's share of the audit fees of clients in an industry (DDF). We then extend this line of thought by further defining specialism in three different ways: (i) a dichotomous measure of the auditor's share of the client's sales revenue in an industry (DDR); (ii) a continuous measure of the auditor's share of the audit fees of clients in an industry (CDF), and (iii) a continuous measure of the auditor's share of the sales revenue of clients in an industry (CDR). We test whether small firms devote a substantial percentage of their resources to one industry, using both continuous and dichotomous measures of the audit firm's share of their portfolio in an industry. We adopt the specialist definition which focuses on dichotomous measures of the audit firm's share of the audit fees of clients in their portfolio within an industry (DAF) and dichotomous measures of the audit firm's share of the sales revenue of clients in their portfolio in an industry (DAR). We extend this line of argument by defining specialists using a continuous measure of the audit firm's share of the audit fees of clients in their portfolio in an industry (CAF) and a continuous measure of the audit firm's share of the sales revenue of clients in their portfolio in an industry (CAR). Finally, perceptions of industry specialisation are estimated using a dichotomous dummy that indicated whether the audit firm has promoted itself as a specialist in the industry (DFP). Details of the methods used to estimate DDF, DDR, CDF, CDR, DAF, DAR, CAF, CAR and DFP industry specialists are contained in the Appendix.

We use these multiple definitions at both the national and city level to test whether industry specialisation might be a source of enhanced revenue in the audit market and whether firms with a brand name can enhance their audit revenues through industry specialisation. We extend Palmrose (1986a) by testing for returns to brand name, non-Big Firm industry specialisation and Big Firm industry specialisation reputations in a single OLS regression (model 2). By expanding model (1) to form model (2), we can jointly test for non-Big Firm and Big Firm industry specialisation:

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[4] Ferguson et al. (2003: 429) observe an average premium of 24% if the auditor is both the city-specific leader and one of the two leading national firms in the industry. This premium disappears if the two leading national firms are not city leaders.

[5] The extant literature has viewed industry specialisation premium as a differentiating feature amongst the (usually) Big Firms. This study investigates a different question – whether the Big Firms premium can be attributed to returns to industry specialist reputations. We thank an anonymous referee for raising this point.

[6] Krishnan (2001) attributes these disparities to 'different bases ...[that] yield different rankings of specialists'. The mean acid test ratio found by Craswell et al. 1995 (5.828) and the peculiar mean current and quick ratios reported by DeFond et al. 2000 (0.447 and 2.157) cast doubt about the generalisability of their results.

$$LAF = \alpha_0 + \beta_1 (\text{Controls}) + \beta_2 \text{Brand} + \beta_3 \text{NBFSpec} + \beta_4 \text{BFSpec} + \varepsilon. \tag{2}$$

where:

NBFSpec = auditor indicator variable, 1 indicates a Non-Big Firm specialist, 0 otherwise,

BFSpec = auditor indicator variable, 1 indicates a Big Firm specialist, 0 otherwise.

We follow this by replicating the basic design of Craswell et al. (1995), creating sub-samples of specialist and non-specialist auditor client industries (models 1 and 3). Model 1 is used to estimate brand name returns in non-specialist industries and then again by removing the specialist auditors in industries where such specialists exist. Model 3 computes industry specialisation returns by excluding the small and medium sized non-specialists and comparing specialist fees with Big Firm non-specialist fees:

$$LAF = \alpha_0 + \beta_1 (\text{Controls}) + \beta_2 \text{Spec} + \varepsilon. \tag{3}$$

where Spec is an auditor indicator variable, set equal to one if the audit firm is an industry specialist, and zero otherwise.

4. Non-audit services

The Big Firm premium might be explained in terms of interdependence between the fees charged by auditors for audit and non-audit services. One rationale for the joint provision of audit and NAS by accounting firms is the existence of economies of scope generated by the two services in association with 'knowledge spillovers' (Simunic, 1984; Antle et al., 1997; Whisenant et al., 2003). Knowledge spillovers are a form of external economy 'arising from providing audits and NAS as joint products' (Abdel-Khalik, 1990, 296). These could be generated if 'the total costs of one firm jointly performing both non-auditing and auditing services are less than the sum of the costs when each service is performed by a different firm' (DeBerg et al., 1991:20). If NAS can be purchased from the incumbent auditor, a client's search and other transactions costs should also be reduced (Simunic, 1984). While the provision of NAS could threaten audit independence (and hence audit quality), joint provision is likely to be more cost-efficient (Simunic, 1984). Moreover, most of the existing empirical papers document a positive association between audit and NAS fees when a simple OLS model is used (Simunic, 1984; Simon, 1985; Abdel-Khalik, 1990; Turpen, 1990; Barkess and Simnett, 1994; Butterworth and Houghton, 1995; Ezzamel et al., 1996; Firth, 1997; Craswell and Francis 1999; Ezzamel et al., 2002; Firth, 2002). This raises concerns as to whether it is appropriate to treat assurance services and other services provided by audit firms as though they are independent (Simunic, 1984; Beck et al., 1988; Abdel-Khalik, 1990; Bartlett, 1993; Davis et al., 1993; Lowenstein, 2002; Malkiel, 2002).

A number of explanations has been offered for the observed positive association between audit and NAS fees. Simunic (1984) and Firth (2002) argue that the joint supply of audit and NAS reduces the price per unit of audit services; so assuming that demand for audit services is price-elastic, clients demand more audit services leading to an increase in total audit fees. This strongly suggests that the relationship between the fees for audit and NAS work should be modelled simultaneously, rather than treating NAS as exogenous, as has been done in prior work. It is important to note in this regard that clients in difficulty might demand more NAS, which might in turn lead to a higher audit fee because of the greater risk or work involved (Simunic, 1984). Alternatively, some client-specific events might generate a demand for consultancy services and necessitate additional auditing (Ezzamel et al., 2002; and Firth, 2002). Firth (2002) contends that mergers and acquisitions, share issues, new accounting and information systems, new CEOs and corporate restructurings might require additional audit and NAS work. Furthermore, Solomon (1989) argues that NAS might lead to a change in the client's organisation that increases the demand for audit services, the NAS market could be uncompetitive, or audit partners might capture part of the NAS fee for themselves. Accounting firms have promoted themselves as global or 'one stop' service providers. Brand name firms capable of providing NAS as well as audit might have a marketing advantage over other auditors in terms of the provision of all of the additional services that are demanded by a client. Concerns have been expressed that the audit service has become increasingly marginalised in the quest for more profitable NAS work, leading to the possibility that the price for audit work declines as NAS business increases (Zeff, 1998; Jeppesen, 1998).

These factors suggest that the measurement of any Big Firm premium needs to take account of the potential endogeneity of NAS. Whisenant et al. (2003) argue that to the extent that audit and NAS fees are jointly determined, the residuals will be correlated and single-equation estimations violate the independent error term assumption of OLS. However, although there are clear a priori reasons to expect audit and NAS fees to be endogenous and the literature on audit and NAS pricing suggests that the services are interrelated, Whisenant

Table 1
Summary of the data collection procedure and model specification

	Raw variable	*Transformed variable*	*Data source*
Dependent variable	Audit fees (£'000)	Natural log of audit fees (LAF)	Datastream
Dependent variable	NAS fees (£'000)	Natural log of NAS fees (from 1992)	Extel
Size proxy	Total assets (£'M)	Natural log of total assets (LTA)	Global Vantage and Worldscope
Risk proxy	Long term debt (£'M)	Long term debt to total assets (DTA)	Global Vantage and Worldscope
Risk proxy	Earnings before interest and tax (£'M)	Return on investment (ROI)	Global Vantage and Worldscope
Risk proxy	Operating profit (£'M)	Dichotomous variable (Loss) = 1 if an operating loss in any of the prior three years; 0 otherwise	Global Vantage and Worldscope
Risk proxy	Net current assets	Current Ratio (Current)	Global Vantage and Worldscope
Risk proxy	Liquid resources	Quick Ratio (Quick)	Global Vantage and Worldscope
Complexity	UK subsidiaries	Square root of the number of subsidiaries (Sub)	Stock Exchange Yearbook
Complexity	Overseas subsidiaries	Foreign subsidiaries to total number of subsidiaries (Foreign)	Stock Exchange Yearbook
Busy period	Financial year-end	Dichotomous variable (YE) = 1 if fiscal year end between December and March; 0 otherwise	Global Vantage and Worldscope
Audit quality	Auditor identity	Dichotomous variable (Brand) = 1 if auditor is a Big Firm; 0 otherwise	Stock Exchange Yearbook

et al. (2003) is the only published study that incorporates simultaneous equation models into the pricing of accounting services. We remedy this deficiency by testing for endogeneity and investigating the extent any simultaneous equation bias affects inferences by estimating the fee relationship using both OLS (model 4) and simultaneous equation (models 4 and 5):

$$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \beta_3\text{LNAS} + \varepsilon. \quad (4)$$

$$LNAS = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \beta_3\text{LAF} + \varepsilon. \quad (5)$$

where LNAS is the natural logarithm of NAS fees (£'000).

5. Monopoly pricing

Evidence that the Big Firm premium could be attributable to monopoly pricing would have significant implications for regulatory bodies, accounting firms and audit clients. Critics contend that the Big Firms have used their dominant market position to create entry barriers and thereby charge excessive fees. For example, Gist and Michaels (1995) call for a change in the structure of the market, stating: '[I]t is obvious that some form of intervention is necessary as the market and free enterprise system cannot be relied upon to remedy the oligopolistic or monopolistic abuses in the profession'. These concerns have troubled researchers for many years (Stigler, 1968:30; Gist and Michaels, 1995:233; Romeo, 1999:62) but have grown more strident in the light of the Enron debacle and the resultant reduction to a Big Four. Although concentration ratios have increased (e.g. Eichenseher and Danos, 1981; Danos and Eichenseher, 1986; Hogan and Jeter, 1999; and Wolk et al., 2001), no systematic evidence of market abuse has appeared in the literature.[7] Consistent with this, the Monopolies and Mergers Commission and the Office of Fair Trading in the

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[7] High concentration ratios are usually explained as a form of product differentiation and concerns over market power 'should be treated with scepticism' (Craswell and Taylor, 1991: 74).

Table 2
Descriptive statistics

	Mean	*Median*	*St. dev.*	*Min*	*Max*
LAF	5.005	4.854	1.261	2.267	9.341
LTA	11.730	11.574	1.674	5.872	18.846
Sub	3.573	3.265	1.889	0.000	14.000
Current	1.592	1.412	0.847	0.015	8.987
Quick	0.966	0.851	0.772	0.012	8.864
DTA	0.132	0.074	0.195	0	3.612
ROI	0.106	0.109	0.123	–1.345	0.692
Foreign	0.254	0.188	0.270	0.000	1.000
YE	0.687	1.000	0.464	0.000	1.000
Loss	0.158	0.000	0.354	0.000	1.000
Brand	0.771	1.000	0.409	0.000	1.000
LNAS	4.479	4.412	1.553	0.000	9.116

LAF = natural logarithm of audit fees; LTA = natural logarithm of total assets (£'000); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE = 1 if fiscal year end between December and March inclusive, 0 otherwise; Loss = 1 if operating loss reported in prior 3 years, 0 otherwise; Brand = 1 if Big Firm auditor, 0 otherwise; LNAS = natural logarithm of non-audit fees.

UK and the Department of Justice in the US did not oppose the recent mergers of major accounting firms. The American evidence is that competition was largely unaffected by the mergers in 1989–1990 (Minyard and Tabor, 1991; Tonge and Wootton, 1991) and there has been no evidence of anti-competitive behaviour (Simunic, 1980; Lee, 1996; and Sullivan, 2002). The Office of Fair Trading (2001) appointed an independent body – the Law and Economics Consultant Group (LECG) – to assess competition in the architecture, law and accountancy professions. Their survey noted the high concentration levels but stated: 'LECG ...have not found evidence of cartel activity among the professions examined.' Likewise, academic research has not uncovered evidence of an anticompetitive market (DeAngelo, 1981; Francis and Simon, 1987; Simon and Francis, 1988; Roberts et al., 1990; Turpen, 1990; Pearson and Trompeter, 1994; and Craswell and Francis, 1999). One explanation for this disparity of opinion is that some segments of the market could be more competitive than others (Simunic, 1980). We analyse the effect of increasing concentration levels on audit pricing by estimating the Big Firm premium (model 1) across four quartiles of clients partitioned by total assets.

6. Data collection

The sample comprises UK firms for the period 1985–2002. Variable definitions and sources of data used to measure them are set out in Table 1. We collected total assets, debt, earnings before interest and tax, financial year end, quick ratio, current ratio, operating profit, share issue and industry listing code data from the Standard and Poor's Global Vantage and Thomson Analytics Worldscope databases. We collected audit and NAS fee data (mandated for years ending on or after 30 September 1992) from the Datastream International, Extel Company Research and Thomson Analytics Worldscope databases. Subsidiary and auditor identity data were collated by hand from hard copies of the published financial statements and the International Stock Exchange Yearbook. Financial clients were removed because the very different nature of their business makes interpretation of their financial statements and ratios problematic and their different regulatory environments might result in different costs for their auditors relative to those of industrials.

We trimmed the sample to eliminate extreme observations in the first and last percentiles of total assets, total debt, operating profit, earnings before interest and tax, audit fees and NAS fees. However, the key results are not materially different if the outliers are Winsorised or included in the sample. These procedures produced a panel of 180 clients covering the period 1985–2002, giving 180x18 = 3,240 firm-year observations.

Consistent with other studies, the audit fee and NAS variables are expressed in logarithmic form in order to reduce their skewness and to prevent the largest clients from unduly influencing the results. The size proxy is similarly transformed, and a square root transformation was applied to the complexity variable (the number of UK subsidiaries). As can be seen from Table 2, the assets, audit and NAS fee variables are well behaved after transformation. The mean and median Current and Quick ratios are similar to the figures the financial statement literature might lead one to expect, unlike the mean acid test ratio (5.828) found by Craswell et al. (1995) and the mean current and quick ratios (0.447 and 2.157) quoted by DeFond et al. (2000). Untabulated analyses reveal that the LAF, LNAS and LTA variables increased over the period, suggesting that clients grew in size and paid higher fees. The concentration ratio rose from 62.4% in 1985 to 86.6% in 2002, indicating a trend by clients to switch to Big Firm auditors. Untabulated correlation coefficient estimates are all below the critical value (0.8) suggested by Judge et al. (1988: 868). We computed variance inflation factors (VIF's) for the only correlations of any magnitude (Current with Quick and LTA with Sub), but since the VIF's were well below the conventional cut-off point of 10 (Hair et al., 1998: 193), we conclude that our results are not likely to be materially affected by multicollinearity amongst the explanatory variables.

7. Results

To make the results section concise and interpretable, we tabulate annual and panel regression results and Fama McBeth (1973) t-statistics for the areas of greatest interest. Since there is some evidence of heteroskedasticity, t-values are based on corrected standard errors using the White (1980) procedure. Coefficients that are significant at the 5% level or better are shown in bold type.

7.1. Quality differentiation tests

The results of the yearly Big Firm premium estimation (model 1) are documented in Table 3. Almost all of the control variables display the predicted sign, with LTA, Sub, Current and Foreign providing the most explanatory power. Consistent with many prior studies, the coefficient on the Brand variable is significant in most years – in all years between 1986 and 1998, but not in 1985 and not after 1998.

The magnitude of the Big Firm premium can be estimated from these results in the following manner. Denote the expected value of Big Firm audit fees as

$$\log AF_{big} = E[LAF] = \alpha_0 + \beta_1 E[Controls] \qquad (6)$$

and the expected value of non-Big Firm audit fees as

$$\log AF_{small} = E[LAF] = \alpha_0 + \beta_1 E[Controls] \qquad (7)$$

Defining the Big Firm premium as the proportionate increase in fees associated with engaging a major firm as the auditor, due allowance being made for work-related differences in fees, it follows from equations (6) and (7) that (after undoing the logarithmic transformation) the premium can be derived from the estimate of the Brand coefficient as

$$\frac{AF_{big} - AF_{small}}{AF_{small}} = e^{\beta_1} - 1. \qquad (8)$$

Using equation (8), annual estimates of the Big Firm premium are given in the final column of Table 3. We set the premium equal to zero in the years when the Brand coefficient was not statistically significant. It can be seen from the Table that the Big Firm premium estimates generally fluctuated in the range 15–20% over the period 1985–1996, except for 1985 (0%) and 1987 (26%). The Big Firm premium increased abruptly to 30.2% in 1997 and 33.9% in 1998, after which it became indistinguishable from zero.

Table 4 documents the results for a pooled time- and firm-fixed-effects model that contains the previous control variables, the Brand dummy and a Brand-year interaction variable for each of the years 1986–2002 inclusive. A fixed-effects model has the advantage of controlling for firm-specific omitted factors that might confound the results in the annual cross-sectional regressions. The fixed-effects estimation allows one to see how the premium varies through time vis-à-vis the benchmark year (1985). The Brand coefficient is significant and positive, indicating the existence of a Big Firm premium in 1985. This contrasts with the annual regression results reported in Table 3, where the Brand coefficient was not significant in that year.[8] The Brand-year interaction variables had significant positive coefficients in the years 1987, 1992, 1994, 1997 and 1998, indicating that the premium was larger in those years than in 1985. These findings might suggest (but see below) that the PricewaterhouseCoopers merger enabled the Big Firms to increase audit fees in the years 1997 and 1998. Over the last four years of the sample period, the audit fee premium falls back to the 1985 level in the fixed effect model and is insignificant in the annual estimations. This reduction in the premium might be attributable to the high profile scandals or the considerable regulatory and political upheaval in the market for professional services. However, since these explanations are not grounded in academic theory, we do not seek to explain how the sources of the Big Firms' premium have evolved over time in this paper.

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[8] Why this is so is not entirely clear. We conjecture that the difference is due to the fixed effects model having a stronger explanatory power than the annual regressions because of its greater number of degrees of freedom, coupled with its controls for possibly confounding unmodelled firm-and-year factors. This would account for why the fixed effects model is able to pick up the brand name effect in 1985 that the annual estimation just fails to do at the 10% level.

Table 3
Annual Big Firm premium regressions

$LAF = \alpha_0 + \beta_1 \text{LTA} + \beta_2 \text{Sub} + \beta_3 \text{Current} + \beta_4 \text{Quick} + \beta_5 \text{DTA} + \beta_6 \text{ROI} + \beta_7 \text{YE} + \beta_8 \text{Foreign} + \beta_9 \text{Loss} + \beta_{10} \text{Brand} + \varepsilon$

	Intercept	*LTA*	*Sub*	*Current*	*Quick*	*DTA*	*ROI*	*Foreign*	*YE*	*Loss*	*Brand*	*F-stat*	R^2	*Premium*
	?	+	+	–	+	+	–	+	+	+	+			%
1985	**–3.283** (8.86)	**0.619** (18.21)	**0.186** (7.25)	–0.030 (0.27)	**0.308** (2.13)	0.469 (0.47)	–0.708 (1.43)	0.204 (1.21)	0.104 (1.13)	0.107 (1.14)	0.138 (1.55)	127.81^a	0.82	**0**
1986	**–2.741** (7.63)	**0.565** (17.18)	**0.212** (8.05)	–0.113 (1.11)	0.058 (0.51)	0.436 (0.75)	–0.369 (0.74)	**0.343** (2.39)	0.015 (0.16)	0.012 (0.12)	**0.174** (1.99)	139.46^a	0.81	**19.0**
1987	**–2.101** (6.33)	**0.494** (16.24)	**0.237** (9.46)	**0.011** (0.12)	0.030 (0.27)	0.474 (0.88)	–0.191 (0.32)	**0.374** (2.34)	0.039 (0.48)	0.088 (0.69)	**0.231** (2.92)	116.55^a	0.80	**26.0**
1988	**–2.625** (9.17)	**0.556** (21.85)	**0.237** (11.10)	–0.059 (0.76)	0.020 (0.21)	0.363 (0.87)	–0.014 (0.03)	**0.318** (2.27)	0.075 (1.06)	0.063 (0.53)	**0.148** (2.10)	141.97^a	0.80	**16.0**
1989	**–2.510** (8.20)	**0.563** (20.86)	**0.209** (9.68)	–0.120 (1.79)	0.070 (0.83)	0.497 (1.35)	–0.379 (0.84)	0.235 (1.57)	0.118 (1.64)	0.142 (1.07)	**0.148** (1.97)	132.75^a	0.80	**16.0**
1990	**–1.441** (5.10)	**0.469** (18.51)	**0.238** (11.71)	**–0.119** (1.98)	**0.030** (0.35)	0.222 (0.75)	–0.027 (0.06)	**0.346** (2.61)	0.074 (1.11)	–0.006 (0.04)	**0.139** (2.03)	143.21^a	0.81	**14.9**
1991	**–0.949** (3.72)	**0.428** (18.41)	**0.253** (13.14)	**–0.186** (2.86)	0.071 (0.85)	0.229 (0.91)	–0.299 (0.85)	**0.439** (3.59)	0.112 (1.82)	0.060 (0.57)	**0.162** (2.46)	154.50^a	0.80	**17.8**
1992	**–0.683** (2.79)	**0.396** (17.32)	**0.253** (12.56)	–0.081 (1.15)	–0.002 (0.01)	0.349 (1.45)	–0.241 (0.84)	**0.522** (4.28)	0.098 (1.56)	0.057 (0.61)	**0.185** (2.70)	141.44^a	0.80	**20.3**
1993	**–0.919** (4.00)	**0.426** (19.76)	**0.242** (13.00)	**–0.175** (2.84)	0.087 (1.21)	0.456 (1.94)	–0.119 (0.61)	**0.555** (4.81)	0.025 (0.41)	0.137 (1.74)	**0.146** (2.08)	177.37^a	0.83	**15.7**
1994	**–0.856** (3.65)	**0.431** (19.68)	**0.227** (12.32)	**–0.180** (3.28)	0.046 (0.69)	0.103 (0.47)	**–0.508** (2.04)	**0.663** (5.91)	0.063 (1.03)	0.037 (0.45)	**0.183** (2.60)	157.40^a	0.81	**20.1**
1995	**–0.952** (4.52)	**0.425** (21.00)	**0.224** (13.00)	**–0.134** (2.54)	0.052 (0.82)	0.098 (0.87)	**–0.526** (2.78)	**0.655** (6.45)	**0.115** (2.05)	0.001 (0.04)	**0.168** (2.46)	178.99^a	0.84	**18.3**
1996	**–0.882** (3.82)	**0.401** (18.60)	**0.214** (12.14)	**–0.103** (2.14)	0.043 (0.64)	0.090 (0.81)	**–0.511** (2.43)	**0.685** (6.97)	0.098 (1.75)	0.014 (0.19)	**0.179** (2.51)	163.24^a	0.82	**19.6**
1997	–0.553 (1.48)	**0.391** (11.62)	**0.230** (7.86)	**–0.246** (3.61)	0.137 (1.48)	0.041 (1.06)	–0.294 (0.75)	**0.759** (4.44)	0.148 (1.55)	0.048 (0.60)	**0.264** (2.61)	126.82^a	0.79	**30.2**

Table 3
Annual Big Firm premium regressions *(continued)*

$LAF = \alpha_0 + \beta_1 \text{LTA} + \beta_2 \text{Sub} + \beta_3 \text{Current} + \beta_4 \text{Quick} + \beta_5 \text{DTA} + \beta_6 \text{ROI} + \beta_7 \text{YE} + \beta_8 \text{Foreign} + \beta_9 \text{Loss} + \beta_{10} \text{Brand} + \varepsilon$

	Intercept	*LTA*	*Sub*	*Current*	*Quick*	*DTA*	*ROI*	*Foreign*	*YE*	*Loss*	*Brand*	*F-stat*	R^2	*Premium*
	?	+	+	–	+	+	–	+	+	+	+			%
1998	**–0.844**	**0.418**	**0.215**	**–0.226**	0.143	0.044	–0.201	**0.576**	0.136	0.043	**0.292**	115.13[a]	0.84	**33.9**
	(2.75)	(14.56)	(8.88)	(4.03)	(1.76)	(0.41)	(0.69)	(4.25)	(1.47)	(0.48)	(2.88)			
1999	**–0.846**	**0.436**	**0.187**	**–0.090**	0.042	0.320	**–0.603**	**0.853**	0.001	–0.082	0.153	135.35[a]	0.85	**0**
	(2.95)	(17.03)	(8.38)	(2.03)	(0.58)	(1.83)	(2.30)	(6.34)	(0.02)	(0.76)	(1.78)			
2000	**–0.921**	**0.423**	**0.186**	**–0.105**	0.026	**0.051**	–0.378	**0.791**	0.047	**0.419**	0.178	114.88[a]	0.81	**0**
	(2.80)	(14.04)	(6.80)	(2.09)	(0.31)	(4.12)	(1.12)	(5.27)	(0.47)	(2.90)	(1.68)			
2001	**–1.309**	**0.496**	**0.124**	**–0.292**	0.233	–0.032	–0.285	**0.793**	0.102	0.166	0.145	145.98[a]	0.85	**0**
	(3.01)	(13.54)	(3.65)	(2.95)	(1.93)	(0.10)	(0.97)	(3.90)	(0.78)	(0.67)	(1.21)			
2002	**–1.236**	**0.461**	**0.144**	**–0.134**	0.136	0.195	–0.384	**0.792**	**0.188**	0.156	0.072	138.22[a]	0.80	**0**
	(3.61)	(15.36)	(5.20)	(2.28)	(1.43)	(0.68)	(1.26)	(5.02)	(1.98)	(1.14)	(0.62)			

[a] significant at the 1% level.

The coefficients shown in bold are significant at the 5% level or lower. The first row shows the parameter estimate and the second row the t statistic (two-tailed) for each variable. The dependent variable is the natural logarithm of audit fees. The models are estimated using a dataset of 180 clients across 18 years (3,240 firm-year observations).

LTA= natural logarithm of total assets (£'000); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE = 1 if fiscal year-end between December and March inclusive, 0 otherwise; Loss = 1 if operating loss reported in prior 3 years, 0 otherwise; Brand = 1 if Big Firm auditor, 0 otherwise.

Premium = $(e^{\beta_{10}} - 1) \times 100$. Premium is set equal to zero if Brand coefficient is not significant at the 5% level.

Table 4
Big Firm Premium Time- and Firm- Fixed Effects regression

$$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \beta_3\text{Brand86} + \beta_4\text{Brand87} + \beta_5\text{Brand88} + \beta_6\text{Brand89} + \beta_7\text{Brand90} + \beta_8\text{Brand91} + \beta_9\text{Brand92} + \beta_{10}\text{Brand93} + \beta_{11}\text{Brand94} + \beta_{12}\text{Brand95} + \beta_{13}\text{Brand96} + \beta_{14}\text{Brand97} + \beta_{15}\text{Brand9} + \beta_{16}\text{Brand99} + \beta_{17}\text{Brand00} + \beta_{18}\text{Brand01} + \beta_{19}\text{Brand02} + \varepsilon$$

		Panel			*Panel*	*Premium*			*Panel*	*ΔPremium*
Intercept	?	**–1.526** (18.72)	**Brand**	+	**0.192** (7.42)	**21.2** *ΔPremium*	**Brand95**	?	0.006 (1.54)	0
LTA	+	**0.474** (63.56)	**Brand86**	?	0.003 (0.71)	0	**Brand96**	?	**0.008** (2.28)	**0.8**
Sub	+	**0.229** (36.48)	**Brand87**	?	**0.007** (2.07)	0.7	**Brand97**	?	**0.012** (3.02)	**1.2**
Current	–	**–0.122** (5.84)	**Brand88**	?	0.001 (0.47)	0	**Brand98**	?	**0.013** (3.14)	**1.3**
Quick	+	**0.056** (2.27)	**Brand89**	?	0.001 (0.14)	0	**Brand99**	?	0.003 (0.72)	0
DTA	+	0.135 (1.75)	**Brand90**	?	0.006 (1.58)	0	**Brand00**	?	0.004 (1.04)	0
ROI	–	**–0.372** (4.34)	**Brand91**	?	0.005 (1.26)	0	**Brand01**	?	0.003 (0.76)	0
Foreign	+	**0.452** (11.52)	**Brand92**	?	**0.011** (2.81)	1.1	**Brand02**	?	–0.001 (0.30)	0
YE	+	**0.070** (3.41)	**Brand93**	?	0.002 (0.58)	0	**N**		3240	
Loss	+	0.001 (0.75)	**Brand94**	?	**0.010** (2.53)	1.0	**F** **R^2**		772.28[a] 0.82	

[a] significant at the 1% level. The coefficients shown in bold are significant at the 5% level or lower. The first row shows the parameter estimate and the second row the t statistic (two-tailed) for each variable. The dependent variable is the natural logarithm of audit fees.

LTA= natural logarithm of total assets (£'000); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE = 1 if fiscal year end between December and March inclusive, 0 otherwise; Loss = 1 if operating loss reported in prior 3 years, 0 otherwise; Brand = 1 if Big Firm auditor, 0 otherwise; Brand86 = 1 if Big Firm auditor in the year 1986, 0 otherwise; Brand87 = 1 if Big Firm auditor in the year 1987, 0 otherwise; Brand88 = 1 if Big Firm auditor in the year 1988, 0 otherwise; Brand89 = 1 if Big Firm auditor in the year 1989, 0 otherwise; Brand90 = 1 if Big Firm auditor in the year 1990, 0 otherwise; Brand91 = 1 if Big Firm auditor in the year 1991, 0 otherwise; Brand92 = 1 if Big Firm auditor in the year 1992, 0 otherwise; Brand93 = 1 if Big Firm auditor in the year 1993, 0 otherwise; Brand94 = 1 if Big Firm auditor in the year 1994, 0 otherwise; Brand95 = 1 if Big Firm auditor in the year 1995, 0 otherwise; Brand96 = 1 if Big Firm auditor in the year 1996, 0 otherwise; Brand97 = 1 if Big Firm auditor in the year 1997, 0 otherwise; Brand98 = 1 if Big Firm auditor in the year 1998, 0 otherwise; Brand99 = 1 if Big Firm auditor in the year 1999, 0 otherwise; Brand00 = 1 if Big Firm auditor in the year 2000, 0 otherwise; Brand01 = 1 if Big Firm auditor in the year 2001, 0 otherwise; Brand02 = 1 if Big Firm auditor in the year 2002, 0 otherwise.

Premium = $(e^{\beta_2} - 1)$. Premium is set equal to zero if Brand coefficient is not significant at the 5% level. ΔPremium is the Big Firm – year interaction. This is the change in the Premium relative to the 1985 level.

An indication of the economic significance of these results is shown in the Premium column in Table 4. As before, the magnitudes of the Big Firm premia are computed by reference to equation (8) and indicate the percentage difference in audit fees with and without the audit being carried out by one of the major firms. Again, when the relevant Brand coefficient was not statistically significant, the premium is set equal to zero. The premium was 21.2% in 1985, which is pretty much the average level reported for the annual regressions in Table 3. The premium increased by only about 1% in some of the later years, and it never fell from the 1985 level, suggesting that too much should not be made of the likely effects of the mergers and scandals on fee levels. Whatever is the source of the Big Firm premium, it appears to have been a temporally stable phenomenon. We now consider some of those factors.

7.2. Brand name and industry specialisation tests

The brand name and industry specialisation OLS estimates (models 2–3) appear in Tables 5 and 6. The variable Spec refers to whether or not the auditor meets our definition of being a specialist in the client's industry. The NBFSpec and BFSpec variables capture a Non-Big Firm or a Big Firm that is an industry specialist. In the case of the DDF and DDR definitions of industry specialisation, the industry must pass a size criterion (contain at least 30 companies) and be important to the firm in terms of its share of industry audit fees or the extent to which it is reliant on the industry for revenue, respectively. The DAR and DAF definitions focus on how big a proportion of the auditor's business comes from the client's industry. These are researcher-derived measures of industry specialisation. In contrast, DFP refers to whether the auditor promotes itself as a specialist in that particular industry. The CDF and CDR definitions are continuous measures of the extent to which the firm is reliant on the industry for audit fees and revenue, respectively. CAR and CAF are researcher-derived measures of the concentration of the auditor's business from the client's industry.[9] Control variables are included in the regressions but are not reported because the coefficients are similar in magnitude to those reported in Tables 3 and 4. As discussed in Section 3, we jointly estimate brand name and specialisation returns (Brand, NBFSpec and BFSpec in model 2) for the Palmrose (1986a) replications. For the Craswell et al. (1995) methodology, we create sub-samples of specialist and non-specialist auditors and estimate returns to brand name (model 1) separately from industry specialisation returns (Spec in model 3). Since brand is invariably significant, only the statistically significant Spec variables are tabulated.

Our analysis shows that returns are generally not significant for industry specialists defined at the national level. The results in Table 5 indicate significant returns when specialisation is defined by reference to a firm's share of the industry's clients and audit fees (DDF). However, the other ways of defining specialisation all fail to yield significant results. The coefficient on Brand is significant but the coefficients on NBFSpec and BFSpec are almost invariably insignificant, suggesting that it is not simply a return to national-level industry specialist reputations. The results in Table 6 show that returns could be significant if industry specialisation is defined at the city-level.[10] We observe significant results when specialisation is defined by reference to a firm's share of the industry clients, fees and revenues (i.e., DDF and DDR), share of the auditor's business that comes from the client's industry (DAF) and its importance to the firm's revenues (i.e., CAR). The other ways of defining specialisation fail to yield significant results. Moreover, additional untabulated results indicate that the returns to city-level industry specialisation are greater if the specialist is restricted to the market leader.

The implications of our findings are that the Big Firm premium could be attributable to brand names, cannot be credited to national-level industry specialist returns, but might be driven by city-level industry specialist returns. The evidence that returns to industry specialisation are significant at the city-level but insignificant at the national level differs from existing research that suggests that industry expertise is rewarded if the auditor is both the city-specific leader and one of the two leading national firms in the industry (Ferguson et al., 2003) or if the auditor is the industry leader (DeFond et al., 2000; Francis et al., 2005). Our mixed results are not surprising given that firms could expect to receive returns on investments in industry specialist expertise whilst competitive pressures could force firms to pass on at least part

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[9] All the regressions include Brand, which is the Big Firm indicator variable, and one of nine ways of defining an industry (DDF, DAF, DDR, DAR, DFP, CDF, CAF, CDR and CAR). Both Big Firms and medium-sized ones register DDF, DAF and DAR industry specialisations throughout the period, but medium-sized firms fail to meet the DDR and DFP criteria in a number of years. To avoid collinearity problems and to facilitate consistent comparison of the results across time, BFspec is included in all of the DDF, DAF and DAR regressions but is not reported for the other estimations. However, the results in the years that medium-sized firms meet the DDR and DFP criteria are not dissimilar to those reported.

[10] This is consistent with the behavioural study carried out by Simnett and Wright (2005) in a Big 4 firm into the knowledge required by auditors specialising in the insurance industry. They found that on-the-job experience was the most prevalent method of audit personnel gaining industry specialist knowledge. If the tacit knowledge of individual auditors is the most important source of industry expertise, this will generally reside at the city-office level rather than be spread equally across all of a firm's offices.

Table 5
Brand name and national industry specialisation panel regressions

$LAF = \alpha_0 + \beta_1 (\text{Controls}) + \beta_2 \text{Brand} + \beta_3 \text{NBFSpec} + \beta_4 \text{BFSpec} + \varepsilon.$

$LAF = \alpha_0 + \beta_1 (\text{Controls}) + \beta_2 \text{Spec} + \varepsilon.$

	Brand	*NBFSpec*	*BFSpec*	*Spec*	*F*	R^2
	+	+	+	+		
DDF	**0.123**	**0.061**	0.038		826.6^{a}	0.82
	(5.81)	(2.36)	(1.23)			
DDF				**0.063**	793.3^{a}	0.79
				(2.27)		
DDR	**0.142**		−0.029		771.1^{a}	0.80
	(6.41)		(0.87)			
DDR				0.029	673.2^{a}	0.76
				(0.83)		
DAF	**0.141**	0.021	0.024		774.5^{a}	0.80
	(6.38)	(0.77)	(0.83)			
DAF				0.031	678.9^{a}	0.77
				(0.94)		
DAR	**0.148**	0.050	0.031		796.9^{a}	0.81
	(6.51)	(1.87)	(1.07)			
DAR				0.024	678.4^{a}	0.79
				(0.57)		
DFP	**0.144**		−0.024		747.9^{a}	0.81
	(6.43)		(0.76)			
DFP				0.054	698.4^{a}	0.81
				(1.17)		
CDF	**0.147**		0.028		674.6^{a}	0.78
	(6.48)		(0.91)			
CDR	**0.140**		0.014		687.9^{a}	0.77
	(6.32)		(0.34)			
CAF	**0.138**		−0.009		642.5^{a}	0.76
	(6.27)		(0.15)			
CAR	**0.142**		−0.015		678.6^{a}	0.77
	(6.40)		(0.14)			

[a] significant at the 1% level. The coefficients shown in bold are significant at the 5% level or lower. The dependent variable is the natural logarithm of audit fees.

The same control variables as appear in Table 3 are included in the LAF regressions, but for conciseness are not reported. The first row shows the parameter estimate and the second row the t statistic (two-tailed) for each variable. Brand = 1 if Big Firms auditor = 1, 0 otherwise; NBFSpec = Non-Big Firms industry specialisation variable; BFSpec= Big Firms industry specialist variable; Spec = dichotomous industry specialisation variable. The definitions of industry specialist are explained in detail in the Appendix.

DDR takes the value of 1 if: (i) the industry contains at least 30 clients and (ii) the number of clients in an industry and the firm's share of the revenue both exceed 10% (20%), 0 otherwise. DDF takes the value of 1 if: (i) the industry contains at least 30 clients and (ii) the number of clients in an industry and the firm's share of the fees both exceed 10% (20%), 0 otherwise. DAR takes a value of 1 if: (i) at least 20% (30%) of the number of the firm's clients and (ii) 20% (30%) of the value of the firm's revenue is from the industry, 0 otherwise. DAF takes a value of 1 if: (i) at least 20% (30%) of the number of the firm's clients and (ii) 20% (30%) of the value of the firm's fees are from the industry, 0 otherwise. DFP takes a value of 1 if the firm promotes itself as a specialist in this industry, 0 otherwise. CDR is a continuous measure of the firm's share of revenue in an industry. CDF is a continuous measure of the firm's share of the audit fees in an industry. CAR is a continuous measure of the share of the firm's revenue from the industry. CDF is a continuous measure of the share of the firm's audit fees from the industry.

Table 6
Brand name and city-level industry specialisation panel regressions

$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \beta_3\text{NBFSpec} + \beta_4\text{BFSpec} + \varepsilon.$

$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Spec} + \varepsilon.$

	Brand	*NBFSpec*	*BFSpec*	*Spec*	*F*	R^2
	+	+	+	+		
DDF	**0.130**	**0.072**	**0.058**		884.3[a]	0.84
	(6.20)	(2.50)	(2.03)			
DDF				**0.084**	754.2[a]	0.80
				(2.59)		
DDR	**0.142**		**0.059**		854.1[a]	0.82
	(6.41)		(2.07)			
DDR				0.031	707.9[a]	0.79
				(1.20)		
DAF	**0.137**	0.038	**0.054**		865.5[a]	0.82
	(6.32)	(1.34)	(2.01)			
DAF				**0.062**	748.9[a]	0.79
				(2.16)		
DAR	**0.132**	0.039	0.031		861.7[a]	0.82
	(6.28)	(1.37)	(1.27)			
DAR				0.020	694.2[a]	0.79
				(0.97)		
DFP	**0.144**		0.003		807.9[a]	0.81
	(6.43)		(0.21)			
DFB				0.004	670.1[a]	0.77
				(0.17)		
CDF	**0.141**		0.018		817.2[a]	0.80
	(6.38)		(0.81)			
CDR	**0.147**		0.014		816.2[a]	0.80
	(6.49)		(0.78)			
CAF	**0.148**		0.043		832.5[a]	0.81
	(6.45)		(1.44)			
CAR	**0.142**		**0.056**		858.6[a]	0.82
	(6.41)		(2.05)			

[a] significant at the 1% level. The coefficients shown in bold are significant at the 5% level or lower. The dependent variable is the natural logarithm of audit fees.

The same control variables as appear in Table 3 are included in the LAF regressions, but for conciseness are not reported. The first row shows the parameter estimate and the second row the t statistic (two-tailed) for each variable. Brand = 1 if Big Firms auditor = 1, 0 otherwise; NBFSpec = Non-Big Firms industry specialisation variable; BFSpec= Big Firms industry specialist variable; Spec = dichotomous industry specialisation variable. The definitions of industry specialist are explained in detail in the Appendix. DDR takes the value of 1 if: (i) the industry contains at least 30 clients and (ii) the number of clients in an industry and the firm's share of the revenue both exceed 10% (20%), 0 otherwise. DDF takes the value of 1 if: (i) the industry contains at least 30 clients and (ii) the number of clients in an industry and the firm's share of the fees both exceed 10% (20%), 0 otherwise. DAR takes a value of 1 if: (i) at least 20% (30%) of the number of the firm's clients and (ii) 20% (30%) of the value of the firm's revenue is from the industry, 0 otherwise. DAF takes a value of 1 if: (i) at least 20% (30%) of the number of the firm's clients and (ii) 20% (30%) of the value of the firm's fees are from the industry, 0 otherwise. DFP takes a value of 1 if the firm promotes itself as a specialist in this industry, 0 otherwise. CDR is a continuous measure of the firm's share of revenue in an industry. CDF is a continuous measure of the firm's share of the audit fees in an industry. CAR is a continuous measure of the share of the firm's revenue from the industry. CDF is a continuous measure of the share of the firm's audit fees from the industry.

of the benefits of specialisation to clients in the form of lower order charges. Moreover, our results have been rigorously tested using a larger number of definitions of an industry specialist and a larger panel of data than extant studies. Why our results differ from the prior work is not entirely clear. We conjecture that the difference is due to industry, cultural and regulatory differences between the UK and other countries and/or the slightly different research design used.

7.3. Knowledge spillovers tests

One possible explanation for the Big Firm premium is that it stems from the major firms being able to retain knowledge spillovers. This might arise if the Big Firms are able to generate more audit revenue, due allowance being made for cross-sectional variations in the drivers of audit work, because of operational audit efficiencies they obtain from providing consulting services to those clients.[11] Preliminary evidence indicating that this might be happening is provided by an untabulated univariate analysis of the data that shows that a larger amount (in terms of money value) of NAS fees is generated by Big Firms when the clients are complex and diversified in their operations than is obtained by non-Big Firms from simple, undiversified clients. This finding must be treated with caution as it might be due to audits of the former being more costly to undertake. We therefore fit both OLS and two-stage simultaneous equation regressions (models 4 and 5) for the years when NAS fee data are available. The OLS model treats NAS as an exogenous determinant of audit fees whereas the simultaneous equations model allows us to explore whether the endogeneity of NAS is an issue that has to be taken into account in determining the impact of NAS on audit fees.

The results of the relationships between audit fees, brand name and NAS are presented in Table 7. The same control variables were included in both the OLS and the 2SLS specifications as were employed in the earlier regressions. We predict that very similar factors that explain the magnitude of audit fees will also drive NAS – namely, client size, risk, profitability and complexity.[12] However, while there is reason to believe that clients with financial year-ends that fall within the peak period December–March impose greater marginal costs on auditors than those with other year-ends, the same does not seem likely to be the case with non-audit assignments. Since the demand for NAS seems unlikely to be heavily influenced by the client's financial reporting cycle, we include the same exogenous variables in the LNAS 2SLS equation, except we exclude the YE variable. The OLS results imply that the audit revenue elasticity with respect to non-audit revenue is 0.138; in other words, an increase in NAS fees of one pound will generate extra audit fees of about fourteen pence. However, we find convincing evidence (at the $p<4\%$ and $p<3\%$ levels, respectively) that audit and NAS fees are interrelated using the Hausman (1978) exogeneity test, suggesting these results need to be treated with caution. When LNAS is estimated as an endogenous variable by fitting a simultaneous equations model, it remains a significant factor. If we focus on the two-stage results, the audit revenue elasticity with respect to non-audit revenue is 0.151; in other words, an increase in NAS fees of one pound will generate extra audit fees of 15 pence. The relationship is much stronger when we consider the impact of audit fee income on non-audit fee revenue. There is clear evidence to suggest that NAS revenue is a positive function of the level of audit fee income. Moreover, the quantitative impact of the LAF coefficient is much greater, an increase in audit revenue from a client of one pound generating additional non-audit income of 93 pence.

The Table 7 results indicate that the Big Firm premium coefficient is not statistically significant after controlling for NAS, suggesting Big Firms charge the same price as a small audit firm. This is contrary to the result shown in the earlier tables, when no control was included for NAS. Taken together, these results imply that the Big Firm premium could be partially attributable to the failure to control for NAS. When allowance is made for the endogeneity of NAS, the significance of the Big Firm premium declines substantially. However, one must interpret this result with a degree of caution because the extent to which NAS might proxy for other omitted variables is unclear. We do not investigate this issue in this paper but believe that

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[11] The unobservability of the costs involved in conducting audits means we are unable to say anything about who captures any Big Firm premium. If Big Firms pay higher salaries then the premium will be shared between the partners and the more junior audit staff.

[12] Ezzamel et al. (2002) and Firth (2002) argue that some company specific events generate a demand for consultancy services and also require extra auditing. We have carried out untabulated sensitivity checks which show that the results of our OLS and simultaneous equation models are not materially different when dummy and interaction variables to control for mergers, share issues, the installation of information systems, a new chief executive officer and restructuring processes are added. However, one must treat the significant audit-NAS relationship and the insignificant event effects with care. Dummies and interaction terms were constructed using back-dated newspaper and microfiche reports. This analysis was undertaken retrospectively and produced a small number of events for the early years of the sample. The lack of variability in the dummy variables in the early years could mitigate against more positive results. Furthermore, there is suggestive evidence of a bias towards larger companies because they receive a relatively greater share of the total press coverage. The latter factor might be important if company specific events that require significantly greater levels of audit effort for small clients are unreported in the national press. We thank an anonymous referee for raising these issues.

Table 7
Brand name and knowledge spillovers OLS and simultaneous equations models

$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \beta_3\text{LNAS} + \varepsilon.$
$LNAS = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{LAF} + \varepsilon.$

Dependent variable	*OLS* *LAF*	*2SLS* *LAF*	*2SLS* *LNAS*
Intercept	**–1.280**	**–1.302**	**–1.438**
	(15.55)	(15.98)	(18.87)
LTA	**0.419**	**0.438**	**0.389**
	(58.19)	(61.24)	(53.18)
Sub	**0.214**	**0.216**	**0.224**
	(33.39)	(34.69)	(31.08)
Current	**–0.106**	**–0.124**	–0.046
	(5.39)	(5.97)	(1.52)
Quick	**0.051**	**0.056**	0.028
	(2.24)	(2.28)	(1.23)
DTA	0.147	0.131	**0.179**
	(1.86)	(1.59)	(2.16)
ROI	**–0.384**	**–0.388**	**–0.303**
	(4.41)	(4.51)	(3.26)
Foreign	**0.456**	**0.466**	**0.354**
	(11.60)	(12.08)	(9.73)
YE	**0.061**	0.028	
	(2.97)	(1.24)	
Loss	0.011	0.009	–0.009
	(0.80)	(0.70)	(0.67)
Brand	0.071	0.093	0.079
	(1.01)	(1.55)	(1.07)
LNAS	**0.138**	**0.151**	
	(3.97)	(4.67)	
LAF			**0.886**
			(12.89)
F	603.21[a]	862.14[a]	317.24[a]
R²	0.82	0.84	0.77

[a] significant at the 1% level.

The coefficients shown in bold are significant at the 5% level or lower.

The first row in each panel shows the parameter estimate and the second row the t statistic (two-tailed) for each variable.

LTA = natural logarithm of total assets (£'000); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE = 1 if fiscal year end between December and March inclusive, 0 otherwise; Loss = 1 if operating loss reported in prior 3 years, 0 otherwise; Brand = 1 if Big Firm auditor, 0 otherwise; LAF = natural logarithm of audit fees. LNAS = natural logarithm of non-audit service fees.

the relationship between NAS and other variables is a valuable avenue for further research.

7.4. Monopoly pricing tests

Our models contain control variables for the size of a client that should be the prime factor in the determination of the price of an audit. However, size might affect audit fee income in more complex ways than is captured by the simple linear specification used in this and earlier studies. For example, a Big Firm might be able to charge more than its smaller brethren for auditing a large client because the client's market is more concentrated. We address this possibility by re-running model 1 for sub-samples partitioned according to the size of the clients. Size partitioning across the panel of data is problematic because clients move between quartiles over the sample period. We therefore present the results of annual estimations in Table 8. The brand name premium is significant for clients from the first quartiles in 1987, 1988, 1994, 1995, 1997–2000 and 2002. For the second quartile, significant brand name returns are reported in 1989–1991, 1993, 1997, 1998 and 2001. A significant brand name coefficient is observed in 1985 and 1992 for the third quartile and in 1987 and 1998 for the fourth quartile. The significant negative brand name coefficient in 2002 for the fourth quartile suggests that the international firms charged significantly *lower* fees than their smaller counterparts. The reasons for this are unclear; we conjecture it could be due to price competition for the prestigious blue-chip clients that were audited by Andersen in the wake of the Enron and WorldCom fiascos. For robustness, we estimated a panel regression across the sub-samples of clients that did not move between quartiles but the results were not materially different from those reported above. These mixed results imply that there is no evidence of systematic anticompetitive pricing and the demand for the quality-differentiated services of a reputable accounting firm is greatest for small clients, consistent with product differentiation (Anderson and Zeghal, 1994).

7.5. Sensitivity analysis

The sensitivity of the results reported in Tables 3–8 have been tested in a variety of ways. Our checks suggest the models are well specified from an econometric perspective. There is no evidence that heteroskedasticity is a problem. Likewise, variable exclusion, consideration of a different model and prior beliefs about variable estimates (Gujarati 1999) suggest that the results are not contaminated by multicollinearity.

Since the annual regression results could be sensitive to firm-specific events not captured by our control variables, we also estimated fixed-effects regressions with dummies for audit firms. An important feature of this procedure is that the Brand variable is substituted with separate variables for each of the large-, medium- and small-sized firms. Consistent with the Big Firm premium evidence reported earlier, we find that the coefficients on the medium and small firms are significantly lower than the Big Firm coefficients. We also sequentially exclude individual accounting firms from the estimate of model 1 and find results that are consistent with our earlier analysis. We find no evidence to suggest that any one particular firm is driving the findings reported in this paper.

In addition to the steps outlined in above, model structure has been further assessed by using different proxies for client size, complexity, risk, brand name and industry specialisation, without the results being materially affected. We flex our industry specialisation definitions by using steeper 20% and 30% hurdle rates. Although there are fewer specialists, the unreported results are not materially different. Likewise, we test the sensitivity of the results reported in Tables 5 and 6 by excluding each firm and industry sequentially to see if any were driving the results. The results were substantially the same.

Functional form has further been examined by considering the possibility that brand name, size, risk and NAS might interact in complex ways. Audit firms might be able to generate more NAS business when the client is particularly large or risky. Big Firms might be particularly well placed to provide NAS and their ability to provide such additional services might lead to larger audit fees. We include various two-way interactions of auditor type, client size, client risk and NAS revenue, but the untabulated results do not support the view that the Big Firms charge more the greater the size or risk of the client.

We acknowledge that our research design could be sensitive to the assumption that auditor choice is an exogenous variable. Recent studies argue that clients are not randomly assigned to audit firms.[13] We control for selection bias using the methodology detailed by Maddala (1983). In the first stage, we estimate an auditor choice probit model to compute inverse Mill's ratios (IMR). Following Ireland and Lennox (2002), we believe that the choice of audit firm will depend mostly on whether the client is large (LTA) and has diverse overseas operations (Foreign). We extend this work by testing whether clients are also drawn to an audit firm that can provide additional consul-

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[13] Ireland and Lennox (2002) find that self-selection among 1,543 listed UK clients is significant and the Big Firm premium is twice as large when selectivity is taken into account. Chaney et al. (2004) observe a Big Firm premium for 15,255 private UK clients that disappears after controlling for self-selection bias. Furthermore, clients choosing Big Firm auditors would have faced higher fees had they chosen a non-Big Firm auditor.

Table 8
OLS regressions partitioned by client size

$LAF = \alpha_0 + \beta_1(\text{Controls}) + \beta_2\text{Brand} + \varepsilon.$

	Smallest quartile		*Second quartile*		*Third quartile*		*Largest quartile*	
	Brand (t-stat)	*Adj R^2 (F stat)*	*Brand (t-stat)*	*Adj R^2 (F stat)*	*Brand (t-stat)*	*Adj R^2 (F stat)*	*Brand (t-stat)*	*Adj R^2 (F stat)*
1985	0.006	0.74	0.214	0.59	**0.382**	0.67	–0.164	0.54
	(0.04)		(1.36)		(2.34)		(0.69)	
1986	0.116	0.53	0.192	0.58	0.275	0.54	–0.023	0.55
	(0.68)		(1.36)		(1.37)		(0.09)	
1987	**0.274**	0.46	0.215	0.54	0.145	0.49	**0.542**	0.50
	(1.99)		(1.61)		(0.90)		(2.00)	
1988	**0.301**	0.53	0.010	0.65	0.076	0.50	**0.468**	0.51
	(2.21)		(0.11)		(0.37)		(2.04)	
1989	0.111	0.53	**0.204**	0.64	0.052	0.41	0.247	0.41
	(0.98)		(1.99)		(0.32)		(1.04)	
1990	0.041	0.63	**0.210**	0.60	0.161	0.46	0.398	0.46
	(0.45)		(2.01)		(0.97)		(1.67)	
1991	0.012	0.58	**0.202**	0.66	0.165	0.55	0.334	0.45
	(0.13)		(1.98)		(1.10)		(1.40)	
1992	0.069	0.58	0.115	0.66	**0.436**	0.52	0.381	0.50
	(0.81)		(1.07)		(2.95)		(1.39)	
1993	0.033	0.61	**0.373**	0.60	0.123	0.58	0.258	0.43
	(0.37)		(3.13)		(0.83)		(1.14)	
1994	**0.176**	0.67	0.218	0.54	0.236	0.57	0.284	0.51
	(1.97)		(1.87)		(1.53)		(1.49)	
1995	**0.181**	0.70	0.137	0.60	0.282	0.59	0.208	0.47
	(2.07)		(1.23)		(1.75)		(1.54)	
1996	0.165	0.57	0.124	0.46	0.125	0.64	0.058	0.70
	(1.81)		(0.95)		(0.80)		(0.31)	
1997	**0.431**	0.60	**0.287**	0.53	0.147	0.54	0.185	0.69
	(3.20)		(2.17)		(1.24)		(1.31)	
1998	**0.431**	0.58	**0.315**	0.67	0.207	0.51	–0.162	0.75
	(3.20)		(2.34)		(1.60)		(0.81)	
1999	**0.365**	0.52	0.122	0.45	0.165	0.66	–0.207	0.74
	(2.65)		(0.91)		(1.21)		(1.58)	
2000	**0.237**	0.50	0.187	0.44	0.091	0.70	–0.215	0.69
	(2.08)		(1.85)		(0.55)		(1.64)	
2001	0.134	0.57	**0.462**	0.53	0.158	0.67	–0.159	0.69
	(0.68)		(3.98)		(1.03)		(0.79)	
2002	**0.378**	0.49	0.246	0.46	0.132	0.64	**–0.409**	0.76
	(2.46)		(1.87)		(0.87)		(2.92)	

[a] significant at the 1% level. The coefficients shown in bold are significant at the 5% level or lower.

The dependent variable is the natural logarithm of audit fees.

The same control variables as appear in table 3 are included in the regressions, but for conciseness are not reported.

The first row shows the parameter estimate and the second row the t statistic (two-tailed) for each variable.

Brand = 1 if Big Firm auditor, 0 otherwise.

tancy services (LNAS). Let denote the unobservable utility of the Big versus non-Big Auditor choice defined by the relationship

$$y_i^* = \gamma_0 + \gamma_1 LTA_i + \gamma_2 Foreign_i + \gamma_3 LNAS_i + v_i \qquad (9)$$

where $y_i = 1$ if $y_i^* > 0$ and $y_i = 0$ otherwise.

The results of our estimation of the auditor choice equation (9) are presented in column (1) of Table 9. All of the explanatory variables exhibit the expected sign and are statistically significant ($p<0.001$). These findings imply that clients characterized as relatively larger (LTA_i), with many overseas subsidiaries ($Foreign_i$) or requiring additional consultancy services ($LNAS_i$) are more likely to hire a large audit firm than a small audit firm.

The next step is to separately state audit fee models for large and small firms as follows

$$LAF_{1i} = \beta_{10} + \beta'_{11} Controls_i + u_{1i} \qquad (10)$$

$$LAF_{0i} = \beta_{00} + \beta'_{01} Controls_i + u_{0i} \qquad (11)$$

where for client i $Controls_i$ is the same vector of proxies for client size, risk, complexity and the opportunity cost of audit labour as used in equation (1) and LAF_{1i} and LAF_{0i} are the natural logarithm of the audit fees paid to a large or small audit firm. For each client i, their choice of a large or small firm determines whether LAF_{1i} or LAF_{0i} is observed. Unlike equation (1), equations (10) and (11) allow the coefficients on the control variables to differ for large and small firms (i.e. $\beta'_{11} \neq \beta'_{01}$). The results of the large and small audit firm demand equations (10 and 11) are presented in columns (2) and (3) of Table 9 respectively. The coefficients on the control variables are generally consistent with our expectations. The estimate of the Big Firm premium ($\exp^{\hat{\beta}_{10}} - \exp^{\hat{\beta}_{00}} = 14\%$) is similar to the mean of the premia reported in Table 3.

In the final stage, we control for self-selection bias by estimating audit fee models for large and small firms

$$LAF_{1i} = \beta_{10} + \beta'_{11} Controls_i + \sigma_{1u}\lambda_{1i} + e_{1i} \qquad (12)$$

$$LAF_{01i} = \beta_{00} + \beta'_{01} Controls_i + \sigma_{0u}\lambda_{0i} + e_{0i} \qquad (13)$$

where $\sigma_{1u}\lambda_{1i} = E[u_{1i} | y_i = 1]$ and $\sigma_{0u}\lambda_{0i} = E[u_{0i} | y_i = 1]$ control for selection. The IMR (λ_{1i} and λ_{1i}) results from equation (9) are used to allow for selection bias in equations (12) and (13). We present the results of these estimations in columns (4) and (5) of Table 9. The coefficients on the control variables are generally consistent with our earlier work and the estimate of the Big Firm premium increases to 23%. The significance of the IMR indicates the importance of controlling for selectivity. Consistent with Ireland and Lennox (2002), these results imply that studies that fail to control for self-selection bias could underestimate the size of the Big Firm premium. The question of whether the Big Firm premium determinants are affected by self-selection bias is left for further work.

8. Summary and conclusions

Prior research on audit pricing has found evidence consistent with the claim that the largest audit firms charging a premium for their services in a number of countries. However, the evidence concerning the UK has been mixed, with some studies reporting a premium and others failing to do so. Our study has two distinguishing features. We start by confirming over a greater time period than hitherto the finding in prior research that the Big Firms appear to earn an audit fee premium, when due allowance is made for factors like the size, complexity and riskiness of a client's business. We add to this earlier work by finding that the premium has eroded in recent years.

The major contribution of the paper is to examine whether this Big Firm premium is associated with omitted factors. We test for these factors using a large panel of data taken from a wider time frame than the extant literature and by providing a number of research design improvements. This is the first study to find that the Big Firm premium might be associated with the provision of NAS to UK audit clients, when proper allowance is made for the fact that the pricing of an audit can be affected by non-audit services, and vice versa. We also examine the possible role of industry specialisation, using a much wider number and variety of measures than have been employed in previous studies. We find that the Big Firm premium cannot be attributed to specialisation at the national level, although there is some evidence of significant returns if specialisation is defined at the city level. Finally we consider whether the Big Firms are colluding over price in the highly concentrated large audit client market. When we partition by client size, we find that Big Firm returns are more significant in the small client sector, consistent with product differentiation rather than abuse of monopoly power.

Our study has a number of limitations. The UK is an excellent test site for examining the relationship between the pricing of audit and non-audit services provided to audit clients because both types of fee have been publicly disclosed for some time. However, the amount the auditor receives for non-audit services is not disaggregated into component parts (e.g. special investigations, tax advice, corporate recovery, mergers and acquisitions and other management advisory services). Changes in various countries concerning the non-audit work that auditors can do for their audit clients could make it possible to narrow down the focus in future investigations.

A second limitation is the essentially ad hoc na-

Table 9
Evaluating the effects of selection bias on audit fees

$\gamma_i^* = \gamma_0 + \gamma_1 LTA_i + \gamma_2 Foreign_i + \gamma_3 LNAS_i + v_{1i}$

$LAF_{1i} = \beta_{10} + \beta'_{11} Controls_i + \sigma_{1u}\lambda_{1i} + e_{1i}$

$LAF_{01i} = \beta_{00} + \beta'_{01} Controls_i + \sigma_{0u}\lambda_{0i} + e_{0i}$

		(1) y_i^*		(2) LAF_{1i}	(3) LAF_{0i}	(4) LAF_{1i}	(5) LAF_{0i}
Intercept	?	**–0.790**	?	**–0.625**	**–0.934**	**–0.527**	**–1.007**
				(2.03)	(3.34)	(1.55)	(3.42)
		(0.001)		(0.044)	(0.001)	(0.082)	(0.001)
LTA	+	**0.128**	+	**0.430**	**0.421**	**0.393**	**0.408**
				(16.02)	(13.79)	(15.72)	(14.24)
		(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
Sub			+	**0.191**	**0.205**	**0.222**	**0.263**
				(8.12)	(7.67)	(8.87)	(9.07)
				(0.001)	(0.001)	(0.001)	(0.001)
Current			–	**–0.250**	–0.121	**–0.264**	–0.087
				(3.19)	(1.02)	(3.31)	(0.78)
				(0.001)	(0.321)	(0.001)	(0.473)
Quick			+	**0.196**	0.145	0.187	0.076
				(2.03)	(1.12)	(1.90)	(0.51)
				(0.046)	(0.304)	(0.066)	(0.610)
DTA			+	0.284	0.076	0.303	0.081
				(1.53)	(0.64)	(2.03)	(0.72)
				(0.127)	(0.522)	(0.047)	(0.508)
ROI			–	**–0.810**	–0.001	**–0.790**	–0.020
				(2.44)	(0.07)	(2.28)	(0.19)
				(0.001)	(0.946)	(0.001)	(0.904)
Foreign	+	**0.264**	+	**0.787**	**0.525**	**0.787**	**0.528**
				(5.41)	(2.01)	(5.41)	(2.06)
		(0.001)		(0.001)	(0.049)	(0.001)	(0.038)
YE			+	0.022	0.017	0.027	0.009
				(0.29)	(0.19)	(0.34)	(0.07)
				(0.769)	(0.834)	(0.760)	(0.893)
Loss			+	0.129	0.023	0.097	0.46
				(1.13)	(0.23)	(0.94)	(0.38)
				(0.260)	(0.821)	(0.406)	(0.796)
LNAS	+	**0.245**					
		(0.001)					
λ_{1i}			?			**–0.779**	
						(6.01)	
						(0.001)	
λ_{0i}			?				0.102
							(1.12)
							(0.291)
R²				**0.85**	**0.83**	**0.85**	**0.83**

The coefficients shown in bold are significant at the 5% level or lower. The first row shows the parameter estimate, the second row the t statistic (two-tailed) and the third row the p value.

LTA= natural logarithm of total assets (£'000); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE = 1 if fiscal year end between December and March inclusive, 0 otherwise; Loss = 1 if operating loss reported in prior 3 years, 0 otherwise; LNAS = natural logarithm of non-audit service fees; λ_{1i} and λ_{0i} are the Inverse Mills Ratios used to control for selection bias for large and small audit firms respectively.

ture of the audit and non-audit pricing models used in this and other studies. A better theoretical understanding of the audit production function and determinants of NAS fees could enable sharper tests to be made by researchers, assuming suitable empirical proxies can be identified.

Consistent with much of the prior literature, a third limitation is that the models used in this study initially assume that auditor choice is exogenous. Our models show that the Big Firm premium increased after controlling for self-selection bias. This study has been unable to ascertain the extent to which the determinants of the Big Firm premium are affected by self-selection bias. We believe that this could be a fruitful avenue for further work.

Appendix

The prior literature defines industry specialisation using a dichotomous measure of the auditors' sales or fees in an industry, hereinafter DAI (Palmrose, 1986a; Craswell et al., 1995 and DeFond et al., 2000). The present study extends this prior work in four ways. First, we compute continuous and dichotomous measures of specialisation to try to capture complexities stemming from firms choosing to invest different amounts in the development of specialist expertise (Krishnan and Yang, 1998). Second, since small firms might devote significant amounts of their resources to one particular industry, we define specialisation in terms of the audit firm's share of their portfolio in an industry, hereinafter AFSI, and the audit firm's perceived areas of industry specialisation (as advertised on websites and in corporate literature), hereinafter AFP. Third, for robustness we estimate three (10%, 20% and 30%) hurdle rates of specialisation. Finally, we define specialisation at both the city-level and national-level (Ferguson et al., 2003). In total, we use nine specialist measures. These measures are derived from the following variables:

$SALES_{jik}$ = sales of company j in industry i audited by firm k,
$FEES_{jik}$ = audit fees of auditor k from company j in industry i,
$CLIENT_{jik}$ = 1 if company j is in industry i and is audited by auditor k; 0 otherwise
K_i = number of (listed) companies in industry i.

Five of the specialist measures are dichotomous indicator variables:

1. A DAI specialist variable, DDR, that takes the value of 1 if the following two conditions hold: (i) the industry contains at least 30 clients and (ii) the aggregate share number of the sales of the audit firm's clients in an industry exceed α = 10% (20%) of the industry's sales revenue. Otherwise DDR is set equal to zero. More precisely:
   If $\{(K_i \geq 30) \cap (SALESSHARE_{ik} > \alpha)\}$, $DDR_{ik} = 1$; otherwise $DDR_{ik} = 0$,
   where K_i is the number of companies in industry i and

   $$SALESSHARE_{ik} = \sum_{j=1}^{J} \left(\frac{SALES_{jik}}{\sum_{k=1}^{K} \sum_{j=1}^{J} SALES_{jik}} \right)$$

   DDR is intended to capture settings where becoming an industry specialist might be a rational goal for an audit firm (condition one) and where the audit firm's clients have a significant share of the economic activity in that industry (condition two).

2. A fee-based DAI specialist variable, DDF, that takes the value of 1 if the following two conditions hold: (i) the industry contains at least 30 clients and (ii) the audit firm's share of the audit fees paid by the industry exceeds α = 10% (20%). DDF = 0 otherwise. More precisely
   If $\{(K_i \geq 30) \cap (FEESHARE_{ik} > \alpha)\}$, $DFR_{ik} = 1$; otherwise $DFR_{ik} = 0$,where:

   $$FEESSHARE_{ik} = \sum_{j=1}^{J} \left(\frac{FEES_{jik}}{\sum_{k=1}^{K} \sum_{j=1}^{J} FEES_{jik}} \right)$$

   DDF is intended to capture settings where becoming an industry specialist might be a rational goal for an audit firm (condition one) and where the auditor has a substantial share of the audit income generated by the industry (condition two).

3. A revenue-based AFSI specialist variable, DAR, that takes a value of 1 if the following two conditions hold: (i) at least $\alpha = 20\%$ (30%) of the number of the firm's clients and (ii) $\alpha = 20\%$ (30%) of the value of the auditors' clients' revenue is from the industry. DAR = 0 otherwise. More precisely:
   If $\{(\%CLIENT_{ik} \geq 30) \cap (\%SALESCLIENT_{ik} > \alpha)\}$, $DAR_{jk} = 1$; otherwise $DAR_j = 0$,where:

$$\%CLIENT_{ik} = \sum_{j=1}^{J} \left(\frac{CLIENT_{jik}}{\sum_{i=1}^{I} \sum_{j=1}^{J} CLIENT_{jik}} \right)$$

$$\%SALESCLIENT_{ik} = \sum_{j=1}^{J} \left(\frac{SALES_{jik}}{\sum_{i=1}^{I} \sum_{j=1}^{J} SALES_{jik}} \right)$$

   DAR is intended to capture settings where the auditor has a large share of its clients from the industry (condition one) and the clients are economically significant (condition two).

4. A fee-based AFSI specialist variable, DAF, that takes a value of 1 if the following two conditions hold: (i) at least $\alpha = 20\%$ (30%) of the number of the firm's clients and (ii) $\alpha = 20\%$ (30%) of the value of the firm's fees are from the industry. DAF = 0 otherwise. More precisely:
   If $\{(\%CLIENT_{ik} \geq \alpha) \cap (\%FEESCLIENT_{ik} > \alpha)\}$, $DAR_{jk} = 1$; otherwise $DAR_j = 0$,where:

$$\%CLIENT_{ik} = \sum_{j=1}^{J} \left(\frac{CLIENT_{jik}}{\sum_{i=1}^{I} \sum_{j=1}^{J} CLIENT_{jik}} \right)$$

$$\%FEESCLIENT_{ik} = \sum_{j=1}^{J} \left(\frac{FEES_{jik}}{\sum_{i=1}^{I} \sum_{j=1}^{J} FEES_{jik}} \right)$$

   DAF is intended to capture settings where the auditor has a large share of both its clients (condition one) and its audit fee income (condition two) from the industry.

5. An AFP specialist variable, DFP, that takes a value of 1 if the firm promotes itself as a specialist in this industry. DFP = 0 otherwise.

We also use four corresponding continuous variables of industry specialism:

1. A revenue-based measure of DAI specialist, CDR: the ratio of the accounting firm's revenue within an industry to the total amount of revenue earned by firms in that industry. CDR is a continuous measure based on the share of the total sales revenue of that industry attributable to the auditor's clients:

$$SALESSHARE_{ik} = \sum_{j=1}^{J} \left(\frac{SALES_{jik}}{\sum_{k=1}^{K} \sum_{j=1}^{J} SALES_{jik}} \right)$$

2. A fee-based measure of DAI specialist, CDF: the ratio of the accounting firm's audit fees within an industry to the total amount of audit fees paid by firms in that industry. CDF is a continuous measure based on the auditor's share of the total audit fees paid by companies in that industry:

$$FEESSHARE_{ik} = \sum_{j=1}^{J} \left(\frac{FEES_{jik}}{\sum_{k=1}^{K} \sum_{j=1}^{J} FEES_{jik}} \right)$$

3. A revenue-based measure of AFSI specialist, CAR: the ratio of the accounting firm's revenue within an industry to the total amount of revenue earned by the firm's portfolio of clients. CAR is a continuous measure based on the share of the total sales revenue of that industry attributable to the auditor's clients:

$$SALESCLIENT_{ik} = \sum_{j=1}^{J} \left(\frac{SALES_{jik}}{\sum_{i=1}^{I} \sum_{j=1}^{J} SALES_{jik}} \right)$$

4. A revenue-based measure of AFSI specialist, CAF: the ratio of the accounting firm's audit fees within an industry to the total amount of audit fees paid by firms in their total portfolio of clients. CAF is a continuous measure based on the proportion of its fees that are derived from the industry:

$$FEESCLIENT_{ik} = \sum_{j=1}^{J} \left(\frac{FEES_{jik}}{\sum_{i=1}^{I} \sum_{j=1}^{J} FEES_{jik}} \right)$$

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The survival of international differences under IFRS: towards a research agenda

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Abstract—The compulsory use of IFRS for the consolidated statements of listed companies in the EU and elsewhere, and the convergence of IFRS with US GAAP, might imply the end of 'international accounting' as an important field of study. However, there are motives and opportunities for international differences of practice to exist within IFRS usage. Some of the original motives for international accounting differences may still be effective in an IFRS context, though in different ways. The opportunities for different IFRS practices are divided into eight types. Hypotheses relating to each of these are proposed, and some ways of testing them are suggested. Some implications of the existence of different national versions of IFRS are noted.

1. The end of the field of 'international accounting'?

The fall of the Berlin Wall led some commentators to ask whether history had ended (e.g. Fukuyama, 1989). The subsequent re-unification of Germany affected accounting, as now explained. Economic difficulties hit the German economy[1] in the early 1990s and the cost of re-unification caused tax rates to rise. These developments restricted funds for investment at exactly the time that opportunities had opened up for expansion by German companies into East Germany and other parts of Eastern Europe. Large German companies needed to access foreign capital for the first time. Partly[2] for this reason, they succumbed to the commercial imperative of publishing financial statements using 'internationally accepted accounting principles',[3] starting with Daimler-Benz in 1993.

The inconvenience of preparing two sets of consolidated financial statements led, in 1998, to permission to use the internationally accepted principles instead of the conventional rules of the *Handelsgesetzbuch* (HGB). This was one of the precursors to the EU's requirement to use International Financial Reporting Standards (IFRS) for the consolidated statements of listed companies that was announced in 2000 and came into effect in 2005 for most EU listed companies.

This compulsory use of IFRS in the EU (and beyond, e.g. Australia) has major implications for accounting research. For example, empirical research on 'German accounting' can no longer be done using current accounting data from listed German groups. Similarly, there is limited interest from academics or students in the causes and nature of differences between German and UK (or even German and IFRS) accounting rules. This gradual disappearance of traditional 'international accounting' will continue as IFRS and US rules converge.[4]

Although the fall of the Wall did not[5] signify the end of history, did it signify the end of the academic field of 'international accounting'? That is, have differences between jurisdictions disappeared for listed companies under IFRS? This paper suggests ways in which international differences have survived and can be the objects of research. The focus is mostly the consolidated statements of EU listed companies from 2005.

This paper aims to identify both the motive and the opportunity for international differences to continue. The motive is investigated in Section 2 by examining the reasons why international differ-

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[1] For example, Germany's largest industrial company, Daimler-Benz, declared losses under US GAAP of DM1,839m in 1993 and DM5,729m in 1995.

[2] Another reason was to increase the familiarity of German companies for customers or group employees.

[3] The phrase used in the 1998 *Kapitalaufnahmeerleichterungsgesetz* (KapAEG).

[4] As agreed by the FASB and the IASB in the Norwalk Agreement of 2002, and as confirmed and made more detailed in a *Memorandum of Understanding* of February 2006. This has led, for example, to IFRS 5 which converges to US GAAP on the subject of held-for-sale assets and discontinued operations, and to SFAS 154 which converges to IFRS on the subject of accounting policy changes.

[5] As, for example, the events of 11 September 2001 showed.

ences existed in the past, and asking whether any of these reasons survive the arrival of IFRS. The opportunity for international differences in IFRS practice to exist is split in Section 3 into eight sources: different versions of IFRS; different translations of IFRS; gaps in IFRS; overt options in IFRS; covert options, vague criteria and interpretations in IFRS; measurement estimations in IFRS; transitional or first-time issues in IFRS; and imperfect enforcement of IFRS. Section 4 summarises the resulting research agenda and notes some policy implications relating to the continuation of national differences within IFRS. A relevant piece of context here is that the Securities and Exchange Commission (SEC) is monitoring[6] whether to accept IFRS from EU companies without the need for reconciliation to US GAAP.

2. Motives for the survival of international differences

As noted above, Section 3 will examine whether there is opportunity within IFRS for international differences in practice to survive. A prior question is whether there is motivation. That is, are corporate managers of listed groups driven by different objectives in different countries when preparing consolidated financial statements under IFRS? This question is investigated in this section.

As already suggested, this paper will focus on the EU. For some illustrations, it will be useful to narrow down further to the EU's two largest economies and capital markets: Germany and the UK. In this context, by 'international differences', I mean systematic differences in the IFRS practices of German groups compared to those of UK groups. A starting point is to examine the literature on German/UK differences to see whether the suggested drivers of difference could survive into an IFRS context.

From the earliest classifications (Hatfield, 1911; Mueller, 1967; Seidler, 1967; AAA, 1977; Nair and Frank, 1980), Germany and the UK are put into different groups, even in classifications with only three or four groups. Nobes (1983) goes further and puts them on opposite sides of a two-group classification. This has some later theoretical and empirical support (e.g. Perera, 1989; Doupnik and Salter, 1993). However, it has also created controversy, especially when the US has been put with the UK (e.g. Cairns, 1997; Nobes, 1998a; Feige, 1997; Nobes and Mueller, 1997; Alexander and Archer, 2000; Nobes, 2003; d'Arcy, 2001; Nobes, 2004).

The suggested reasons for the differences between the German and UK national 'accounting systems' include differences in financing systems, legal systems and tax systems. Zysman (1983) proposes three types of financing system: capital market (e.g. UK, US), credit-based governmental (e.g. France and Japan), and credit-based financial institutional (e.g. Germany). Nobes (1988) proposes two types: shareholder 'outsiders' (e.g. UK, US) and bank/state/family 'insiders' (e.g. Germany, France). More recent research (e.g. Franks and Meyer, 2001) is consistent with a continued but less pronounced dichotomy. Nobes (1998b) suggests that, unless a country is culturally dominated by another, its financing system is the main driver of its financial reporting system. Some evidence now supports this (Xiao et al., 2004; Tarca et al., 2005; Sellhorn and Gornik-Tomaszewski, 2005).

The largest of German listed companies were already adapting to a shareholder/outsider financial culture by voluntarily using IFRS or US GAAP from the middle 1990s (Weissenberger et al., 2004). However, many German listed companies waited to use IFRS until driven by compulsion from the Deutsche Börse and then the EU Regulation. Such German companies might still be dominated by 'insider' finance and might still feel no commercial need for the creative accounting and extensive disclosures seen in UK or US markets. They might therefore have motivations towards a particular style of IFRS reporting, assuming that opportunities for different styles exist (see Section 3).

The literature also divides the *legal* systems of the developed world into two main types: Roman (code) law and common law (e.g. David and Brierley, 1985). This affects the regulation of financial reporting. For example, the preparation of financial statements under German national rules is largely specified by the HGB and tax law, whereas the detail in UK national rules is found in accounting standards written in the private sector.

La Porta et al. (1997 and 1998) find a statistical connection between strong equity markets and common law countries, noting a tendency for stronger legal protection of investors in such countries. Empirical research also suggests a relationship between legal systems and financial reporting practice. Jaggi and Low (2000) find that companies in code law countries make fewer disclosures. Ball et al. (2000) find that accounting income in code law countries is less timely, particularly in incorporating economic losses. Bushman and Piotroski (2006) also show that bad news is reported faster in countries with higher quality legal systems (which they connect, in this context, to common law). For each of these last three papers, a relationship is suggested between better financial reporting and common law countries. However, a relationship between stronger equity markets and better reporting would presumably also have been found, which would have been a more parsimonious hypothesis.

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[6] For example, see Nicolaisen article at www.sec.gov/news/speech/spch040605dtn.htm.

For IFRS reporting in Germany and the UK, the content of the standards is now the same. However, monitoring and enforcement remain national. This includes the nature and regulation of audit, the stock exchange rules, the activities of the stock exchange regulator and of any other monitoring or review bodies. International differences in these areas continue. So, the Roman/common dichotomy could still affect financial reporting practice. Section 3 suggests examples.

Turning now to the third issue, the dominance of tax over German financial reporting has been well documented (e.g. Haller, 1992). Lamb et al. (1998) compare Germany and the UK in some detail and suggest that the operational linkage between tax and financial reporting is much stronger in Germany. Nobes (1998b) suggests a connection with financing systems. That is, unless there is a strong competing purpose for accounting, taxation will dominate it. The existence of an 'outsider' financing system creates the strong competing purpose for accounting of giving useful information to investors. Consequently, under UK national requirements but not German, two sets of rules are needed on several accounting issues: one for taxation and one for financial reporting.

However, does this difference remain relevant in the context of the use of IFRS for consolidated statements? At first sight, it does not, because IFRS consolidated accounting is, even in Germany, separated from tax calculations which begin with the pre-tax accounting profit of unconsolidated individual entities. However, as explained below, there are two reasons why tax practice may influence IFRS consolidated statements: convenience (in Germany) and tax conformity (in the UK).

In Germany, companies are required to continue to prepare unconsolidated financial statements under the conventional rules of the HGB for calculations of taxable income and distributable income. This is irrespective of any use of IFRS for consolidated or unconsolidated statements (Haller and Eierle, 2004). In some areas, the tax-driven accounting choices of the unconsolidated statements might flow through to consolidated IFRS statements. For example, asset impairments are tax deductible in Germany (but not in the UK), so there is a bias in favour of them. They might survive into IFRS consolidations in Germany, given the room for judgment in IFRS impairment procedures (see Section 3).

In the UK, IFRS is allowed for individual company financial statements and therefore as a starting point for calculations of taxable income. The tax authorities generally expect the statements of a parent and other UK group members to use the same accounting policies as group statements.[7] To take an example, the recognition and measurement of intangible assets has tax implications.[8] Consequently, given that IFRS requires considerable judgment in this area, individual companies using IFRS will have an incentive to make interpretations of IAS 38 (Intangible Assets) in order to minimise capitalisation and therefore tax, and then these will flow through to consolidated statements.

A way of summarising this section is to say that national accounting traditions are likely to continue into consolidated reporting where scope for this exists within IFRS rules. This is not to suggest that this continuation of practices results merely from inertia, but that the reasons for the different traditions will in some cases remain relevant. However, inertia might be a further explanation in itself, as might a company's conscious desire to disrupt its accounting as little as possible for the better understanding of internal and external users.

A further aspect of this concerns not companies but the regulators of companies. Regulators might be one of the causes of the existence of national versions of IFRS, as explained further in Section 3. The mix of political pressures on regulators varies from country to country, caused partly by the above factors: financing system, legal system and tax system. For example, some countries have well-organised lobby groups of finance directors. Some countries have experienced a major use of leasing because of particular features of their tax systems. A regulator in a country with an important leasing industry and an assertive lobby group might be more likely to issue a pro-industry[9] interpretation on lease accounting.

Another way of approaching this is to suggest that culture affects accounting (e.g. Gray, 1988; Doupnik and Salter, 1995). This may be true, but Nobes (1998b) suggests that it might be better to see national culture as affecting or including the above factors (e.g. the legal system or the financing system) that then affect accounting. Therefore, it might not be necessary to consider culture separately, especially as there are difficulties in measuring it (Gernon and Wallace, 1995; Baydoun and Willett, 1995).

3. Opportunities for the survival of international differences

The purpose of this paper is to identify potential systematic and sustained international differences in practice among IFRS companies. Section 1 proposed eight sources of opportunity for the survival of international differences of practice despite the adoption of IFRS. These are now examined in turn. It is assumed in this section that some motive (including inertia) exists for the differences, as discussed in Section 2. It is not intended always to link particular motives to particular types of practice difference, although in some cases references are made to this for illustration. In many cases several motives may contribute.

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[7] I am grateful to Joan Brown (then of the Inland Revenue's Large Business Office) for this point (meeting of 23.7.2003). It related to parents and groups both using UK GAAP, particularly to the FRS 18 (para. 17) requirement to use the most appropriate accounting policy. A similar conclusion might be arrived at under IAS 8 (para. 10).

[8] Finance Act 2002, Schedule 29.

[9] That is, an interpretation that makes leases more popular by restricting the recognition of liabilities by lessees.

Following from Section 2, several of the illustrations in the section compare Germany and the UK, but examples are taken from elsewhere when they are more relevant.

Different versions of IFRS

Despite adoption or alleged adoption of IFRS, international differences in the IFRS rules in force at a particular date can occur. Three cases are examined here. First, there are differences between IFRS and EU-endorsed IFRS. In the first half of 2005, three such differences existed, two of which were resolved by the second half of 2005. Given that more such differences are likely to arise in the future (McCreevy, 2005), it is worth looking at these three as examples.

Two of the differences of early 2005 between IFRS and EU-endorsed IFRS related to IAS 39. The IASB's version of IAS 39 (para. 9) (that was permitted for 2004 and 2005 reports) allowed an entity to designate any financial asset or liability as 'at fair value though profit or loss'(marked to market). This was regarded as unacceptable by, among others, the European Central Bank, and this led to the removal of this option from the EU-endorsed version (Van Hulle, 2005; Zeff, 2006). Consequently, a non-EU company following IFRS could have marked to market its held-to-maturity investments but an EU company following IFRS could not have. This particular issue was resolved by IASB issuing, in June 2005, an amendment[10] to IAS 39 that restricted the option, and this was endorsed by the EU.[11]

The other difference relating to IAS 39 concerned the restrictions on the permission for hedge accounting. This time, political pressure in the EU had led to *more* flexibility in the EU-endorsed IAS 39 than in the IASB's version (Whittington, 2005). This difference remains for 2006 reports. So, for example a French bank that exercises the full EU-endorsed permission will have a less volatile profit figure than a UK bank that denies itself the fuller permission or than an Australian bank that must follow AASB 139, a standard based on the restrictive non-EU version of IAS 39.

The above has outlined two types of endorsement issue: greater non-EU options and greater EU options. A third type is illustrated by the problem with IFRIC Interpretation 3, 'Emission Rights' of 2004. The EU objected to the solution required by IFRIC 3 and refused to endorse it. This led the IASB, in June 2005, to withdraw IFRIC 3, although to confirm that IFRIC's interpretation of IAS 20 and IAS 38 was correct. In the brief period when IFRIC 3 was in force but unendorsed, an EU company (unlike non-EU companies) need not have complied with it. However, in this case, presumably the EU company should have come to the same conclusion as IFRIC 3. There may be future cases where non-endorsement could lead to different accounting results.

The next case of an area of difference within IFRS rules does not relate to the EU but to Australia. In that country, direct compliance with IFRS is not required but instead IFRS has been turned closely, *but not exactly*, into Australian standards that are then legally imposed on companies. To take an example of the differences, IAS 31 allows a group to choose between proportional consolidation and equity accounting for its holding in a joint venture entity. By contrast, AASB 131 (para. 38) requires equity accounting. This is an Australian 'carve out', although the Australian standard can correctly state that compliance with it ensures compliance with IFRS. However, it is possible to envisage a national standard that was 'converged with' IFRS but did not ensure full compliance. More generally, the precedent of carve outs will be noticed by regulators around the world as they respond to political pressure from companies, which will vary internationally (see Section 2).

The last case of difference within IFRS rules concerns implementation dates and year ends. New standards generally have an in force date of 'annual periods beginning on or after 1 January 200X'. However, early application is usually allowed, so two quite different versions of IFRS can be in force at the same time. Another aspect of this is that the EU endorsement process can take many months. So, some parts of IFRS might be in force but not endorsed at a particular company's year end. An EU company would be required not to obey such parts of IFRS unless they were consistent with endorsed IFRS (KPMG, 2005).

Furthermore, many companies in some countries (e.g. in Australia and the UK, but not in Germany) have accounting periods that do not begin on 1 January. So, researchers might find that a sample of companies with annual reports relating to years ending in 2006 are subject to different versions of IFRS. More subtly, some companies (e.g. UK retail groups) choose to have accounting years comprising exactly 52 or 53 weeks, so some have accounting years that begin on 28 December, thereby escaping a new standard.

In conclusion, this sub-section's hypothesis is:

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[10] With effect from 1 January 2006.

[11] On 15 November 2005.

H_1: International differences in practice exist among IFRS companies due to differences in the version of IFRS being used.

Examples of sub-hypotheses here are:

$H_{1(a)}$: French banks exhibit less earnings volatility than British or Australian banks because of using less restrictive hedge accounting criteria.

$H_{1(b)}$: Australian groups do not use proportional consolidation for joint ventures whereas some continental European groups do.

This latter sub-hypothesis includes the idea (of Section 2) that national accounting traditions are likely to continue under IFRS: proportional consolidation was compulsory in France (Richard, 2001) and common elsewhere in continental Europe (e.g. Ordelheide, 2001:1,389). Proportional consolidation, compared to equity accounting, increases the group's sales, cash and other important figures.

Different translations of IFRS

Under the EU Regulation 1606, the various translations of IFRS into European languages have legal status in their various countries. As in any field, there is a risk that the process of translation will change or lose meaning from the original version, in this case English. Two examples are given here.

Cash flow statements are required by IAS 7, reconciling to 'cash and cash equivalents'. The term 'cash equivalents'is defined in paragraphs 6 to 9, including:

> An investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months ...

This is a risible attempt to avoid writing a rule, as opposed to a principle. It is not clear why it was necessary to include 'normally' in a sentence that continues with 'say'. The Portuguese translation[12] of the standard omits the word 'say'. This improves the standard but does not translate it accurately. As a result, it would be more difficult in Portugal than in Ireland to argue successfully that an investment with a maturity of just over three months is a cash equivalent.

As a further example, IAS 41 (para. 34) requires an unconditional government grant related to a biological asset to be recognised as income when the grant becomes 'receivable'. The Norwegian[13] version (DnR, 2006: 543) translates this as '*mottas*', which means 'received'. This is an important difference.

This all leads to:

H_2: For some topics, different translations of IFRS lead to different practices.

Gaps in IFRS

In a sense, there are no gaps in IFRS because IAS 8 (para. 10) tells an entity how to choose accounting policies when no other part of IFRS applies. In such a case, resort is made to the general criteria of the IASB's *Framework*, to parts of IFRS related to the gap, and to standards of other bodies that use a similar *Framework* (most obviously,[14] US GAAP). This leaves entities with considerable room for manoeuvre, and allows the continuation of differences in practice.

An example of such a gap in 2005 and 2006 is accounting for insurance contracts. The general topic is addressed by IFRS 4 but a number of areas are left unresolved. Furthermore, entities were specifically exempted (IFRS 4, para. 13) from the requirements of IAS 8 for some aspects of policy choice. A second example of a gap in 2005 was oil and gas exploration, because IFRS 6 did not apply until 2006 (and, anyway, allows many choices).

From Section 2, the hypothesis here is that national traditions will continue as a way of filling any gaps in IFRS. This will include different ways of interpreting the Framework as part of applying IAS 8. That is,

H_3: For topics on which there are no specific rules in IFRS, German practice is different from UK practice.

A particular sub-hypothesis would currently relate to accounting for insurance contracts.

Overt options in IFRS

In the early 1990s, there were large numbers of options in international standards. This was caused partly because many standards had been written before the *Framework* was published in 1989. Also, the IASC operated on the basis of the need for a 75% majority of votes of its Board members. The members (mainly accountancy bodies) and their representatives at the Board (mainly partners in large audit firms or employees of large companies) came from diverse backgrounds and were subject to political pressure (e.g. see Zeff, 2002). One way of passing a standard in this context was to insert options.

These options have been gradually removed, particularly in 1993 and in 2003 as a result of two 'improvement' exercises. In the first of these, many options were highlighted by the IASC with the labels 'benchmark treatment' and 'allowed alternative'. The IASB has not continued this

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[12] Discussions with José Gonçalves Roberto of the Ordem dos Revisores Oficiais de Contas, 15.11.2002. For the Portuguese text, see the Annexes to Regulation 1725/2003.

[13] Norway, although not an EU country, has implemented the Regulation as a member of the European Economic Area.

[14] I refer to the US rather than the UK here not because the US Framework is necessarily closer but because fewer UK standards than US standards cover more ground than IFRS or are more detailed than IFRS.

Table 1
Examples of overt options in IFRS*

IAS 1	Choice of content of statement of changes in equity (paras. 8, 96).
IAS 1	No format requirements for balance sheets or income statements (paras. 76, 81).
IAS 2	FIFO or weighted average for the determination of the cost of inventories (para. 25).
IAS 2	Marking to market allowed for inventories of commodity broker-traders (para. 3).
IAS 7	Net basis allowed for cash flow statements (para. 21).
IAS 7	Choice of classification for interest and dividend flows (para. 31).
IAS 16	Cost or fair value measurement basis for classes of property, plant and equipment (para. 29).
IAS 19	Actuarial gains and losses can be taken (a) immediately in full to the SORIE, (b) immediately in full to the income statement, (c) in full to income over the remaining useful lives of employees in the plan, (d) in part to income over that period, (e) in full or in part to income over a shorter period (paras. 92 – 93A).
IAS 20	Asset grants can be shown as a deduction from the asset or as deferred income (para. 24).
IAS 23	Choice of capitalisation or expensing for interest costs on constructed assets (paras. 7 and 10).
IAS 27	In parent statements, subsidiaries can be shown at cost or as available-for-sale investments (para. 37).
IAS 28	In investor statements, associates can be shown at cost or as available-for-sale investments (para. 38).
IAS 31	In group statements, a choice of proportional consolidation, or equity accounting for joint venture entities (para. 30).
IAS 31	In venturer statements, joint ventures can be shown at cost or as available-for-sale investments (para. 46).
IAS 38	Cost or fair value measurement for some types of intangible asset (para. 72).
IAS 39	Choice of cost basis or marking to market for some financial assets and liabilities (para. 9). (Other choices are also available within para. 9.)
IAS 40	Permission to classify a property held under an operating lease as an investment property (para. 6).
IAS 40	Entity-wide choice of cost or fair value as measurement basis for investment property (para. 30).

* Paragraph numbers as at 30 April 2006.

practice for any new or revised standards, but the terminology still remains in some un-revised standards (e.g. IAS 23).

Table 1 shows examples of overt options in IFRS. These do not include the large number of options in IFRS 1 (first-time adoption), but these are discussed later. The issue for this paper is whether options are exercised systematically differently from one jurisdiction to another, so that 'international accounting differences' survive. I suggest that this is likely to be the case, as now explained.

Let us again take the example of the UK and Germany, restricting ourselves as usual to the consolidated statements of listed companies. I suggest that tradition will be a major influence on the choices. Overall, the hypothesis is:

H_4: The choice of IFRS options by UK and German groups is different.

In more detail, taking five examples from Table 1, I suggest that:

(a) (IAS 1) UK groups will generally continue to use the financial position format of the balance sheet (format 1 of Schedule 4A of the Companies Act 1985). For example, this is used in the model IFRS formats suggested by the UK firm of PricewaterhouseCoopers (2005). However, German groups will mostly continue to use the report format, as found in the HGB §266 and then adopted by German groups that moved to IFRS from the mid-1990s.

(b) (IAS 1) UK groups will present a Statement of Recognised Income and Expense (SORIE) which is similar to the UK Statement of Total Recognised Gains and Losses, whereas German groups will present the broader Statement of Changes in Equity.[15]

(c) (IAS 2) UK groups will mainly continue to use FIFO whereas many German groups will use weighted average because it is common under HGB practice, given that FIFO is restricted by tax law (Kesti, 2005). LIFO is also found in unconsolidated statements in Germany, but not allowed by IAS 2.

(d) (IAS 19) UK groups will take actuarial gains and losses immediately in full to the SORIE

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[15] The choice will be removed if a standard based on the IASB's exposure draft of March 2006 is issued.

Table 2
Examples of covert options or vague criteria in IFRS

IAS 1	Determination of whether a liability is current on the basis of expected date of settlement or purpose of holding (para. 60).
IAS 8	The determination of materiality for various purposes (para. 5).
IAS 11	Use of percentage of completion method only if the outcome of a contract can be estimated reliably (para. 22).
IAS 12	Recognition of deferred tax asset for a loss carryforward only if future taxable profit is probable (para. 34).
IAS 12	Recognition of deferred tax liability on unremitted profits from subsidiaries only if dividends are probable in the foreseeable future (para. 39).
IAS 14	The determination of reportable segments based on a mixture of factors (para. 9).
IAS 17	Lease classification based on 'substantially all the risks and rewards' with no numerical criteria (para. 8).
IAS 21	Determination of functional currency based on a mixture of criteria (paras. 9–12).
IAS 27	The identification of a subsidiary on the basis of 'power to control' (para. 4).
IAS 28	The identification of an associate on the basis of 'significant influence' (para. 2).
IAS 31	The identification of a joint venture on the basis of joint control of 'strategic financial and operating decisions' (para. 3).
IAS 36	Identification of an indication of impairment based on a mixture of criteria (paras. 12–14).
IAS 37	Recognition of a provision based on probability of outflow of resources (para. 14).
IAS 38	Capitalisation of development costs when all of various criteria are met (para. 57).
IAS 38	Amortisation of intangible assets only if useful life is assessed as finite (para. 88).
IAS 39	Use of cost basis where equity instruments cannot be measured reliably (para. 46).
IAS 39	Estimation of hedge effectiveness as a condition for use of hedge accounting (para. 88).
IAS 40	Use of cost basis, despite entity-wide choice of fair value, for an investment property whose fair value cannot be measured reliably (para. 53).
IAS 41	Use of cost basis for a biological asset whose fair value cannot be measured reliably (para. 30).
IFRS 3	Identifying the acquirer in a business combination presented as a merger of equals (para. 20).
IFRS 5	Treatment of assets as held-for-sale if expected to be sold within one year (para. 8).

whereas German groups will continue to take them to income using the corridor (smoothing approach).

(e) (IAS 40) some UK groups will continue to use fair value for investment properties but German groups will continue to use cost.

Further predictions such as these could be made, and expressed as testable sub-hypotheses.

Covert options, vague criteria and interpretations in IFRS

There is further scope for internationally different practice because of different interpretations, covert options or vague criteria in IFRS. I separate this from different practice caused by the inevitable estimations involved in operationalising the standards (see below). Examples of covert options or vague criteria are shown in Table 2. As may be seen, some of these depend upon what is 'probable'. Doupnik and Richter (2004) suggest that German accountants interpret the word 'probable' (which occurs in many places in IFRS) more conservatively than US accountants. I now examine four of the items in Table 2: the definition of a subsidiary, identifying the functional currency, capitalisation of development costs, and indications of impairment.

Under IAS 27, a subsidiary is an entity over which another has 'the power to govern the financial and operating policies' (para. 4). This power can exist *de facto* for a minority shareholder if the other shareholders are widely dispersed and in practice do not exercise their voting rights. However, IAS 27 does not address this exact issue, and the IASB notes that some preparers of financial statements have misunderstood this, perhaps being influenced by pre-IFRS national practices (IASB, 2005: 2).

As a second example, under IAS 21, a group must identify the functional currencies of its subsidiaries, branches, joint ventures and associates. Such companies are seen as coming in two types, as in Table 3.

One might expect that an entity's functional currency would generally be that of its country of operation. If so, IAS 21 gives the same result as using

Table 3
Two types of foreign entity

	Distant entity	*Highly integrated entity*
Functional currency	Foreign	Parent's
Translation rates	Closing/average (i.e. current rate method)	Historical for historical cost items (i.e. temporal method)
Gains and losses	To equity	To income

the current rate method. This has been virtually universal practice in the UK under SSAP 20 (e.g. ICAEW, 1992; ACCA, 1992). However, under IAS 21, subsidiaries are sometimes seen as on the right of Table 3, leading to quite different results. For example, the German chemical company, Bayer, notes in its 2005 Report (p.93) that: 'Where the operations of a company outside the euro zone are integral to those of Bayer AG, the functional currency is the euro'. Bayer states that this is rare, meaning that the current rate method is generally used. However, a similar German company, BASF, states (pp.96/7) that the functional currency throughout Europe is the euro, and this would include UK subsidiaries. That is, for them, the temporal method is used. So, if the pound falls against the euro, a UK's subsidiary's buildings fall in Bayer's consolidated balance sheet but not in BASF's. It seems unlikely that these differences reflect different economic realities. They result from the need to assess a company's functional currency based on potentially conflicting indications from a series of criteria in IAS 21.

The third example is the requirement to capitalise certain development costs under IAS 38 (para. 57). Under EU national requirements, capitalisation is sometimes banned (e.g. the German HGB, §248) and sometimes allowed but not required (e.g. the UK's SSAP 13, para. 25). EU national requirements do not generally[16] contain a *requirement*, like IAS 38's, to capitalise when certain criteria are met. A famous example of the effect of this is Volkswagen's voluntary transition to IFRS from German accounting in 2001: the increase in shareholders' equity caused by capitalisation of development costs was 41%. A similar large effect occurred for BMW.

It is somewhat difficult to compare these large German motor car companies with an equivalent British company. However, the point is that capitalisation depends on demonstrating that all of a list of vague criteria are met, such as feasibility of completion, intention to complete, and availability of adequate resources to complete. Therefore, there is scope for deliberate or unconscious systematic international difference, driven by the factors discussed in Section 2. For example, as explained there, it is clear that German capitalisation for IFRS consolidation purposes has no tax implications. However, the position for the UK is different. On the other hand, capitalisation runs far more against the German tradition of conservatism than it does against the British tradition.

A fourth example of covert options relates to impairment of assets. The issue of *measurement* of impairments is dealt with below under 'estimations'. However, the prior issue is whether there is an impairment at all. This may depend upon several factors, including the degree of prudence in the valuation of assets before any impairment (more prudence means less need for impairments) and how IAS 36's criteria for identifying indications of impairment are used. Kvaal (2005) finds that the occurrence of impairments of non-goodwill intangibles was associated with changes in top executives in Germany but not in the UK, under very similar impairment standards and before annual impairment of goodwill became standard practice.

In conclusion, a general hypothesis is as follows:

H_5: Covert options in IFRS are exercised differently by UK groups than by German groups.

For many covert options of Table 2, such as the four examined above, there should be sufficient published information to test several sub-hypotheses of H_5. For example:

$H_{5(a)}$: UK groups use the current rate method for foreign subsidiaries more extensively than German groups do.

Another way of looking at this is that the existence of the IASB's International Financial Reporting Interpretations Committee (IFRIC) and its predecessor[17] is evidence of the potential for different interpretations of standards. The IASB's preference for principles-based rather than rules-based standards (Schipper, 2003; Nobes, 2005) means that it tries to avoid detailed prescription. IFRIC publishes lists of topics that have been raised with it but that it has decided not to deal

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[16] The author is not aware of any that do in the 25 member states, although plans for convergence with IFRS might lead to this in some cases.

[17] The Standing Interpretations Committee (SIC).

Table 4
Examples of estimations in IFRS

IAS 2	Net realisable value of inventories (paras. 30, 31).
IAS 11	Costs attributable to a contract (para. 16).
IAS 12	Tax rate for deferred tax calculations based on the expected manner of settlement or recovery (para. 51).
IAS 16	(and IASs 17, 38, 40) Depreciation (or amortisation) based on estimates of useful life, residual value, and pattern of consumption (paras. 50, 51 and 60).
IAS 16	(and IASs 38, 40) Fair value when selected as a measurement basis (paras. 31 – 34).
IAS 19	Pension obligations based on estimates of mortality, final salary, etc. (para. 64).
IAS 36	Discounted cash flows or net realisable values for impairments (para. 18, etc.)
IAS 37	Best estimate of provisions based on percentage likelihoods of outflows (para. 40).
IAS 39	Fair values for certain financial assets and liabilities (para. 48).
IAS 41	Fair values for biological assets (para. 12).
IFRS 2	Fair value of equity instruments (e.g. share options or shares in an unlisted company) granted to employees (para. 11).
IFRS 3	Allocation of cost of a business combination to assets and liabilities of acquiree based on fair values (para. 36).

with (e.g. IFRIC, 2005). At least two answers were thought plausible by those who raised these topics. A research approach would be to examine practice in areas considered but not acted on by IFRIC or to examine practice in areas where an IFRIC Interpretation or draft has been issued, but before it comes into force. A difficulty may be that the issue is not sufficiently major for accounting policies to be disclosed by companies, so that data cannot be collected.

Schipper (2005) warns that pressure on the IASB to write interpretations will increase. If the IASB does not respond, one source of interpretations will be the SEC's prescriptions on the IFRS financial statements of the several hundred EU companies that are registered with it. These interpretations will only apply directly to SEC-registered companies but may have influence more widely. There will also be pressure for interpretations from individual national regulators or from regional bodies, such as the Committee of European Securities Regulators or the European Financial Reporting Advisory Group (e.g. see EFRAG, 2005). Although the regulators will attempt to co-ordinate their activities (IOSCO, 2005), different national interpretations may arise formally as well as informally.

Estimations in IFRS

As IAS 8 (para. 23) reminds us: 'The use of reasonable estimates is an essential part of the preparation of financial statements ...'. The use of management judgment in estimates is seen as one aspect of earnings management by Healy and Wahlen (1999), who examine the scope for it in a US context. Over time, the need to use estimates to operationalise IFRS has increased. I distinguish these estimations related to measurement from estimations related to recognition or classification as in the sub-section above. Table 4 gives some examples of measurement estimations, two of which are examined below.

Depreciation (or amortisation) is required for assets with limited useful lives that are measured on a cost basis under IASs 16 (property, plant and equipment), 17 (finance leases), 38 (intangibles) and IAS 40 (investment property). It is also required for assets held at fair value under IASs 16 and 38 but not, curiously, under IAS 40 (see Nobes, 2001). Where depreciation *is* required, it is necessary to estimate useful life and residual value, the latter now at current prices.[18] The depreciation method (e.g. straight line or reducing balance) is also an estimate not a policy choice, because it depends on how the asset wears out.

I suggest that tradition, convenience and tax will play roles here. UK tradition (FEE, 1991) is that a convenient method is used (typically for plant: straight line, zero residual value and 10-year life). This is done in the knowledge that an entirely separate scheme of capital allowances operates for tax purposes. German tradition was (Haller, 1992), and for unconsolidated statements remains, to accelerate expenses by using the minimum lives allowed by tax law and the reducing balance method (but changing to straight line near the end of an asset's life).

It is clear that the tax-based useful lives and other estimates should be abandoned by German groups for IFRS purposes. For example, Volkswagen's transition showed an increase in shareholders' funds of 36% as a result. Related to this, reducing balance has largely[19] been abandoned for IFRS statements, partly perhaps because an amendment to the HGB[20] had already required the removal of tax-based policies from consolidated statements prepared under German domestic rules. However, in some other EU countries, reducing balance might continue under IFRS.

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[18] IAS 16 (para. 6) of 2003, whereas IAS 16 (para 46) of 1993 required the continued use of the original price level.

The general hypothesis is that:

H_6: Estimations under IFRS are biased differently in German groups than in UK groups.

Sub-hypotheses based on the contents of Table 4 could be created.

Transitional or first-time adoption issues

One transitional issue has already been dealt with under 'different versions of IFRS': sometimes a new standard allows a period during which its requirements are merely encouraged. This subsection focuses on transitional issues that can lead to long-run effects on IFRS financial statements.

An example concerns business combinations. The original version of IAS 22 (of 1983) had allowed goodwill to be written off immediately against reserves; formerly a common German and UK practice. The 1993 version of IAS 22 required capitalisation followed by amortisation over a life limited to 20 years, but it allowed companies to retain the old write-off practice with respect to old goodwill. Then the 1998 version of IAS 22 allowed an amortisation life in excess of 20 years but only with annual impairment calculations. IFRS 3 does not allow any of these practices but once more 'grand-fathered'[21] them (para. 79). Consequently, German IFRS statements might have old goodwill amounts at zero, but might not, depending on their previous German practice. The potential amounts of missing goodwill are larger for later dates of transition to IFRS.

For adoption of IFRS in 2005 (the normal case for UK listed groups), IFRS 1 applies. Paragraph 15 of IFRS 1 also permits previous goodwill practice to continue for old goodwill. For a UK company this usually means to treat pre-1998 goodwill at zero[22] and to amortise subsequent goodwill over 20 years. The resulting incoherent goodwill figure from a UK balance sheet[23] is allowed to be brought into the opening IFRS balance sheet. Consequently, under IFRS, German and UK groups are likely to have smaller amounts of goodwill from otherwise similar French groups (which never wrote off goodwill against reserves). This difference will last for many years, and will also affect goodwill impairments.

Another example of an IFRS 1 transition option concerns the measurement of land and buildings. Before IFRS, German groups were required to measure land and buildings at historical cost, depreciated and impaired, perhaps excessively as noted earlier. UK groups were required (by SSAP 19, para. 11) to measure investment properties at current values, and allowed (by FRS 15, para. 42) to do this for other properties. However, FRS 15 (which applied from 2000) allowed previous non-current revaluations to be retained. IFRS 1 (para. 17) allows these old values (or current fair values) to be brought into the opening IFRS balance sheet as though they were costs. However, these values can be much higher than depreciated costs, particularly than German depreciated 'costs'. There is evidence[24] that these traditions will affect the starting point for IFRS. If so, the international difference in balance sheet values, depreciation charges and impairment losses will last as long as the fixed assets are held.

There are several further options in IFRS 1 (para. 13) which might have systematically different effects in different countries. The general hypothesis is:

H_7: Pre-IFRS differences between national practices have a significant effect on IFRS financial statements.

Examples of sub-hypotheses, from above, are:

$H_{7(a)}$: German and UK groups have more goodwill written off against reserves than French groups do.

$H_{7(b)}$: The ratio of IFRS book value to market value of land and buildings is lower for German groups than for UK groups.

Imperfect enforcement of IFRS

The last of the suggested sources of opportunity for international differences despite a requirement to use IFRS is that the degree of enforcement of rules (and therefore compliance with them) varies internationally. To illustrate this, I will retain the EU as a context, and particularly the contrast of Germany and the UK.

As noted earlier, enforcement (including monitoring) of compliance with IFRS remains a nation-

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[19] A survey by the author of the 2002 IFRS statements of 28 German listed companies (names starting with K-N) shows only two companies still using reducing balance, and three providing no information.

[20] §298, as amended in 1998.

[21] That is, allowed previous practices to be left in place for previous transactions.

[22] The UK standard, FRS 10, also contained grand-fathering clauses allowing old goodwill to remain written off as had been common practice under SSAP 22.

[23] For example, that of 31 December 2003, for a date of transition to IFRS of 1 January 2004 (i.e. for first IFRS statements for 2005).

[24] Values in excess of cost are not allowed under HGB rules, and the option to bring assets in at a fair value deemed to be cost did not exist when most large German companies adopted IFRS. By contrast, some UK companies (e.g. Marks & Spencer) have used the option for first-time adoption.

Table 5
Summary of main hypotheses

H_1: International differences in practice exist among IFRS companies due to differences in the version of IFRS being used.
H_2: For some topics, different translations of IFRS lead to different practices.
H_3: For topics on which there are no specific rules in IFRS, German practice is different from UK practice.
H_4: The choice of IFRS options by UK and German groups is different.
H_5: Covert options in IFRS are exercised differently by UK groups than by German groups.
H_6: Estimations under IFRS are biased differently in German groups than in UK groups.
H_7: Pre-IFRS differences between national practices have a significant effect on IFRS financial statements.
H_8: Compliance with IFRS by German groups is lower than that by UK groups.

al matter within the EU. It has been suggested (La Porta et al., 1997) that enforcement of accounting rules is stronger in the UK than in Germany. Hope (2003) constructed an index of compliance and registered Germany substantially lower than the UK. Furthermore, a great deal of evidence has been amassed that compliance by German groups with international standards was lax despite an audited statement of compliance by directors (e.g. Street and Bryant, 2000; Street and Gray, 2001). By contrast, compliance with standards in the UK since the creation of the Financial Reporting Review Panel (FRRP) in 1990 is generally regarded as having been high (Brown and Tarca, 2005).

In 2005, a body loosely based on the model of the FRRP was established in Germany (Brown and Tarca, 2005). It remains to be seen whether this will dramatically improve compliance with IFRS. Unless it does, the following hypothesis might be confirmed:

H_8: Compliance with IFRS by German groups is lower than that by UK groups.

Much of the historical evidence for this relates to missing disclosures in the case of German groups. If this continues, analysts will be less able to interpret German financial statements than UK ones. If German compliance improves, researchers could choose another EU country, and it is likely that one could be found where compliance remains poor.

4. Conclusion: a research agenda and some policy implications

International differences in financial reporting have been the subject of a large field of research and teaching, especially from the 1980s onwards. The compulsory use of IFRS for consolidated statements from 2005 in several major capital markets, and the convergence of IFRS and US GAAP, have had a major impact on this. This paper investigates whether international differences are likely to continue to exist for such consolidated statements.

The *motives* for differences in national accounting systems were examined in Section 2. It was suggested that, although some aspects of these no longer apply for the consolidated statements of listed companies, other aspects of the systems of financing, law and tax could still drive international differences in practice under IFRS where scope for it exists. Inertia and the desire to minimise change for preparers and users would contribute to the desire to maintain pre-IFRS practices.

The *opportunity* for systematic international differences in IFRS practice was examined in Section 3 under eight headings. This led to eight main hypotheses, with some proposals for sub-hypotheses, many expressed in terms of differences between German and UK IFRS reporting. The main hypotheses are summarised in Table 5. Suggestions were made about how some of the hypotheses could be tested. The hypotheses could be rephrased for other pairs of countries or more widely.

In addition to addressing whether international differences have survived, the hypotheses are important taken together because of their implications for the international comparability of financial statements, such as whether there are international differences in the quality of earnings. Some of the hypotheses are more important than others and some are more easily testable than others. However, this will depend on the countries chosen for investigation, so no ranking by importance is suggested here.

Some types of difference investigated by the hypotheses may reduce over time while others continue or increase. Those that may reduce include the gaps in IFRS (H_3), overt options (H_4) and transitional issues (H_7). Those that may increase include special EU versions or other versions of IFRS (H_1).

In conclusion, it is suggested that, like rumours of the death of history, those of the death of 'international accounting' have been greatly exaggerated. Researchers are encouraged to critique the hypotheses and, if they seem plausible, to test them. Major changes to accounting rules and practices, such as the arrival of IFRS, will also have created other new opportunities for research.

The implications for users of IFRS financial statements are that international comparability may have increased but that large differences are likely to remain. For the IASB and other regulators, this paper identifies areas that might be addressed if international differences are to be removed. A further policy implication relates to the SEC's assessment of whether IFRS statements should be accepted without reconciliation to US GAAP. At first sight, the analysis here might provide excuses for further delay by the SEC. However, some of the opportunities for international differences within IFRS were already apparent to the SEC (e.g. overt options) and some others are inherent in any set of standards (e.g. covert options and measurement estimations). There are arguments here for assessment of IFRS practice on a country-by-country basis rather than EU-wide.

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CONTENTS

Access this journal online 2

Editorial advisory board 3

Linking environmental activity and environmental disclosure in an organisational change framework
Carol Ann Tilt 4

Rethinking creativity in the accounting profession: to be professional and creative
Abdullah Al-Beraidi and Tudor Rickards 25

Motivation for activity-based costing implementation: administrative and institutional influences
Adebayo Agbejule 42

Corporate perceptions of web-based environmental communication: an exploratory study into companies in the Australian minerals industry
Sumit K. Lodhia 74

Calls for papers 89

Announcement 93

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Accounting and Business Research

Volume 36 Number 4 2006

Contents

In Memoriam: Sally Aisbitt 251

Articles

Dividend valuation, trading and transactions costs: the 1997 partial abolition of dividend tax credit repayments — Lynn Hodgkinson, Kevin Holland, Richard H. G. Jackson 253

The road to uniformity: accounting change in UK voluntary hospitals — Neil Robson 271

Governance and takeovers: are public-to-private transactions different from traditional acquisitions of listed corporations? — Charlie Weir, Mike Wright 289

The impact of depreciation-type adjustments on the distribution of accounting earnings — John R. Hillier, Roger J. Willett 309

A research note

Fair value and executory contracts: moving the boundaries in international financial reporting — Peter Walton 337

Correction

A ranking of accounting research output in the European region — Kam C. Chan, Carl R. Chen, Louis T. W. Cheng 345

Book Review

R. Anthony Rayman, *Accounting Standards: true or false?* — Simon Archer 349

Notices 353

Forthcoming Articles

Lee D. Parker, Financial and external reporting research: the broadening corporate governance challenge; comment from Simon Archer and reply from Lee D. Parker

Vincent C. Chong and Darren M. Johnson, Testing a model of the antecedents and consequences of budgetary participation on job performance

Gary Giroux and Rowan Jones, Investigating the audit fee structure of local authorities in England and Wales

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Accounting and Business Research, Vol. 36. No. 4. p. 251. 2006

In Memoriam: Sally Aisbitt

Sally Aisbitt died at the age of 43 in August 2006. She leaves many of us deeply missing a friend and colleague who was exceptional in many ways.

Sally's roots were in the 'Scandinavian' part of England. She was of Yorkshire stock, studied at the University of East Anglia, qualified in audit firms in Stockton and Middlesbrough, and then taught at the University of Teesside. Fittingly, Sally studied Scandinavian (and French) for her first degree, and then used this knowledge in her specialist research area of Scandinavian financial reporting.

Like several of our colleagues, Sally achieved the transition from a teaching post into a research-led institution via PhD studies; in her case with a thesis in 2000 on harmonisation in the Nordic region. Then began a flood of papers in refereed journals; the first published in 2001 in this journal. At the time of her death, several papers were in press, and more were nearing completion. Sally had not even reached her prime.

All the while, Sally was working hard on Open University (OU) teaching materials, writing text-book chapters, helping to edit a journal (*Accounting in Europe*) and organising conferences. The present authors and others, such as her OU colleagues Peter Walton and Judy Day, attest to Sally's remarkable efficiency and organisation. She volunteered for difficult tasks, and she delivered a good product on time. However, there was something more impressive than this prodigious output of well-crafted material: Sally was unfailingly cheerful and helpful. Actually, she was somewhat more than cheerful: she had a dry and alarming sense of humour that made you wonder whether this soberly-dressed professional lady, who was apparently hardly smiling, could possibly have just said the impish thing that you thought you had heard. Sally's efficiency included carrying a corkscrew in her handbag. Being business-like can be a facilitator of enjoyment rather than a bar to it.

Sally was a visiting scholar at the University of Sydney for the first half of 2006. On arrival, she told us that she was trying hard to put up with no teaching or administration and with constant good weather. Sally was branching out into a study of IFRS adoption in Australia. While there, it gradually became clear that there was something wrong with her health. Typically, Sally kept working hard, and she continued sending us all cheery and efficient e-mails until a few weeks before the end.

Sally also leaves behind another life: that of the vicar's wife of Attleborough in Norfolk. At her funeral, so many clergy, parishioners and academic colleagues arrived to celebrate her life that the large Norman church ran out of standing room. Sally will be greatly missed by the wide range of those she interacted with. We will at least be able to remember her spirit and enthusiasm, as well as to read her papers.

Lisa Evans
Christopher Nobes

Accounting and Business Research, Vol. 36. No. 4. pp. 253-270. 2006

Dividend valuation, trading and transactions costs: the 1997 partial abolition of dividend tax credit repayments

Lynn Hodgkinson, Kevin Holland and Richard H. G. Jackson*

Abstract—Although UK resident tax-exempt shareholders lost the right to repayment of tax credits on dividends paid by UK resident companies in July 1997, they could continue to receive tax credit repayments in respect of dividends received from Irish resident companies until December 1998. In July 1997 the rate of tax credit on Irish companies' dividends was 21%, and this was reduced to 11% in December 1997. We obtain insights into the incentives and behaviour of UK tax-exempt investors in response to these changes in the relative 'tax attractiveness' of investments in Irish resident companies. We find that only at its highest rate, 21%, was the level of dividend tax credit on Irish companies' dividends sufficient to induce changes in UK tax-exempt shareholders' investment strategies; and that the propensity for dividend capture by tax-exempt investors is heightened when the dividend tax credit yield is of the order of 0.8% or more and dividend yield is of the order of 2.6% or more.

1. Introduction

The payment of dividends represents an important, predictable interaction between companies and shareholders. Numerous effects or 'non-effects' have been attributed to dividend policy. Modigliani and Miller (1961) demonstrate that, under certain market assumptions, firm value is independent of dividend policy, though unanticipated changes can impose tax and adjustment costs on shareholders. Conversely, in a setting characterised by information asymmetry between managers and shareholders, dividend policy can increase firm value by reducing agency costs (Rozeff, 1982) and revealing managers' inside information to the capital markets (Ross, 1977). Other value relevant effects have been attributed to differential investor level marginal tax rates as between dividend income and realised gains, and to tick size, settlement costs, uncertainty in ex-dividend prices and market microstructure. These effects are not wholly mutually exclusive and, therefore, one or more of them can interfere with and confound attempts to examine in isolation any other. For example, a hypothesised tax-induced effect may not occur due to the existence of transactions costs. Alternatively, the culmination of a number of tax changes may be sufficient to outweigh the transactions costs. Thus care is needed to avoid spurious empirical detection and overstatement of the value of one of the changes.

In a market valuation context, investor level tax considerations are only important when they impose costs or benefits on the 'price setting' or marginal shareholder and, therefore, influence their pricing decisions. This paper investigates a change in the dividend-related cash flows accruing to tax-exempt institutional investors. In the UK, institutional investors dominate the London Stock Exchange (LSE) in terms of the volume and value of shares owned and traded; and, more importantly, tax-exempt institutional investors dominate in terms of price setting (Bell and Jenkinson, 2002).

The UK Finance (No.2) Act 1997 abolished the right of UK resident tax-exempt shareholders (predominantly UK pension funds and UK insurance company tax-exempt pension businesses – hereafter referred to as 'TEPIC investors') to claim repayment of tax credits on dividends paid by UK resident companies (hereafter referred to as 'UKCOs') on or after 2 July 1997. Such shareholders could, however, under the terms of the *UK – Republic of Ireland Double Taxation Convention*

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This paper was accepted in June 2006.

in operation as at July 1997, continue to obtain tax credit repayments on dividends received from companies resident in the Republic of Ireland (hereafter referred to as 'ROICOs').[1,2] This state of affairs continued only until 31 December 1998, the double taxation convention having been revised by an amending protocol dated 4 November 1998.

Observing changes in investor behaviour as between the above periods can provide insights into investor incentives, expectations and attitudes concerning dividends. In order to abstract from signalling and agency considerations we test a number of hypotheses concerning stock price changes in response to variations in the availability and level of dividend tax credit repayments. These hypotheses link the relative 'tax attractiveness' of investment in ROICOs (as compared to UKCOs) over the periods set out above to the actions of TEPIC investors, and are designed to obtain insights into the incentives to and behaviours of such investors. In particular, we examine the trade-off between the availability of dividend tax credit repayments and transaction costs.

The paper's main contributions can be summarised as follows: (i) the development and testing of tax-based hypotheses over a period containing several taxation changes; and (ii) the development of a model which can explain the relationship between dividend yield, transaction costs and the value of dividends to a TEPIC investor. The potential for impact of confounding, unrelated changes to market and trading arrangements is mitigated in that the period over which the dividend taxation changes considered in the paper occurred is relatively short.

Our results can be summarised as follows. TEPIC investors appear to be the marginal investors in ROICOs only during the period when Irish dividend tax credit repayments were available at the rate of 21% (as compared to 0%, at that time, for dividends from UKCOs). This is consistent with changes in the relative rates of tax credit repayment between UKCOs and ROICOs inducing a change in TEPIC investors' strategies. The results suggest that a TEPIC dividend clientele formed in ROICOs when the differential between the tax credit available from UKCOs and ROICOs was at its largest. This clientele subsequently dissipated when Irish dividend tax credit repayments were available at the rate of only 11% (again, as compared to 0% for UKCOs). These results are consistent with TEPIC investors' transaction costs being of sufficient magnitude to outweigh the now reduced potential tax benefits of holding shares of ROICOs and suggest that investors seek to maximise after tax returns rather than tax benefits. We deduce that TEPIC investors' propensity to capture dividends is heightened when dividend yield is of the order of 2.6% or more; and when dividend tax credit yield (value of dividend tax credit as a proportion of cum-dividend price) is of the order of 0.8%, which is lower than the level of transactions costs suggested by James (2000) and implies that, while dividend tax credit capture offsets transactions costs, non-tax based factors in trading decisions must pertain. Our results also suggest that TEPIC investors were the marginal investors in UKCOs prior to the abolition of tax credit repayments, which is consistent with the findings of Bell and Jenkinson (2002).

The remainder of this paper proceeds as follows: the next section discusses the relevant legislation affecting tax-exempt investors and illustrates the impact of changes in the taxation of dividends; previous work examining ex-dividend day price changes is discussed in the third section; the fourth section discusses the methodology, hypotheses and data; the results are presented and discussed in the fifth section; an analysis is made of transaction costs in the sixth section and the final section concludes.

2. Relevant tax legislation and tax-exempt investors

During the early part of the period under review, the Republic of Ireland and the United Kingdom both operated a partial imputation system regulating the interaction of the corporate and personal tax systems with respect to dividends. The key features of both countries' systems were identical.[3] A company paying a (net) dividend was required to pay advance corporation tax (ACT) to their tax authority equal to the product of the basic rate of income tax and the gross dividend, where the gross dividend was equal to the net dividend plus the ACT. Shareholders received the net dividend plus an imputed tax credit ('tax credit') which together equalled the gross dividend. If the shareholder's marginal tax rate on dividend income ('marginal

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[1] Similarly, under Irish domestic legislation, Irish resident pension funds could also obtain repayments of tax credits from Irish resident companies. The general repayment of dividend tax credits to tax-exempt investors was abolished from Irish domestic legislation in April 1999.

[2] Many of these companies were (and, indeed, still are) listed on the London Stock Exchange. The Irish Stock Exchange Ltd was established following the December 1995 demerger of 'The International Stock Exchange of the United Kingdom and the Republic of Ireland Limited'. Until that point, most Irish companies had dual listing on the Dublin and London Stock Exchanges (Mulligan, 1996). In order to alleviate the 'market presence' concerns of some Irish companies a 'special association agreement' allowed dual listed companies the option to maintain their dual listing status – and many of the larger Irish companies continue to hold such status (Lucey, 2001). Irish firms seeking an initial quotation post December 1995, however, had to choose between the two markets.

[3] This version of the UK imputation system was abolished by the Finance Act of 1999 with effect from 6 April 1999.

Table 1
ROICOs and UKCOs: tax credit rates on dividends and availability of tax credit repayment to tax-exempt investors

Panel A: Rates of tax credit on dividends

Period	*Percentage rate of tax credit as applicable to gross dividend*	
	ROICOs	*UKCOs*
6th April 1995 to 5th April 1996 (inclusive)	23	20
6th April 1996 to 5th April 1997 (inclusive)	23	20
6th April 1997 to 2nd December 1997 (inclusive)	21	20
3rd December 1997 to 5th April 1998 (inclusive)	11	20
6th April 1998 to 5th April 1999 (inclusive)	11	20
After 5th April 1999	0	10

Panel B: Availability of tax credit repayment to tax-exempt investors

UKCOs' dividends	Repayment available up to and including 1 July 1997; not on or after 2 July 1997
ROICOs' dividends	Repayment available up to and including 31 December 1998; not on or after 1 January 1999

rate') was equal to the starting or basic rate of income tax, no further action was required. If the shareholder's marginal rate was greater than the basic rate, an additional payment, by the shareholder, was due to the tax authorities equal to the amount of the gross dividend multiplied by the excess of the higher rate over the basic rate of tax. If, on the other hand, the shareholder's marginal rate was less than the basic rate of tax they could obtain a repayment equal to the amount of the gross dividend multiplied by the difference between their marginal rate and the basic rate of tax. Hence, a tax-exempt investor could reclaim an amount equivalent to the dividend tax credit in full.

After 1 July 1997, however, the right of TEPIC investors to obtain a repayment of the tax credit on dividends received from UKCOs was abolished. The ability of tax-exempt investors resident in Ireland to obtain repayment of the tax credit on dividends received from ROICOs, however, continued until the abolition of dividend tax credits in April 1999. Intriguingly, though, during the period 2 July 1997 to 31 December 1998, TEPIC investors could continue to obtain repayment of the tax credits on dividends paid by ROICOs, under the terms of the *UK – Republic of Ireland Double Taxation Convention* then in operation. One objective of taxation conventions is the avoidance of discrimination between taxpayers of the two contracting states. Post July 1997, Irish domestic legislation continued to allow repayment of tax credits on dividends from ROICOs to tax exempt investors similarly resident. The convention extended that right to TEPIC investors investing in those same ROICOs – thereby ensuring equal treatment.[4]

The tax credit rates applicable to dividends from both ROICOs and UKCOs varied over the period under review and are set out in Table 1. As a result of the changes in the rate of tax credit repayment in both the UK and Republic of Ireland, five distinct country-regime periods can be identified in which the relative attractiveness of UKCOs' and ROICOs' dividends changed:

i) Prior to 2 July 1997 TEPIC investors in both UKCOs and ROICOs were able to reclaim the tax credit associated with those companies' dividends. We designate this as period *Both*.

ii) From 2 July 1997 TEPIC investors were not able to reclaim any tax credit in respect of dividends paid by UKCOs. We designate this period *UK0%*.

iii) From 2 July 1997 to 2 December 1997 (inclusive) TEPIC investors were entitled to the repayment of tax credits at the rate of 21% on dividends received from ROICOs. We designate this period *Irish21%*.

iv) From 3 December 1997 to 31 December 1998

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[4] The entitlement to repayment was given by para. 2(b), which originally read as follows: 'A resident of a Contracting State who receives dividends from a company which is a resident of the other Contracting State shall, subject to the provisions of sub-paragraph (c) of this paragraph and provided he is the beneficial owner of the dividends, be entitled to the tax credit in respect thereof to which an individual resident in that other Contracting State would have been entitled had he received those dividends, and to the payment of any excess of that tax credit over his liability to tax in that other Contracting State.' Sub-para. (c) (referred to above) provides that the entitlement to repayment is not available where the beneficial owner controls 10% or more of the voting power in the company paying the dividend. In the amended treaty, the original para. 2 was deleted.

(inclusive) TEPIC investors were entitled to the repayment of tax credits at the rate of 11% on dividends received from ROICOs. We designate this period *Irish11%*.

v) After 31 December 1998, TECPIC investors were not entitled to any repayment of dividend credit on dividends received from either ROICOs or UKCOs. We designate this period *Irish0%*.

The availability of tax credit repayments to tax-exempt shareholders may generate a preference for dividend income over capital growth. Bond et al. (1995) conclude that the combination of tax incentives and pension fund influences 'is likely to result in significantly higher dividends payout ratios than would be chosen by companies in the absence of the tax bias.' Indeed, one of the justifications of the July 1997 change in the UK was to relieve the pressure on companies to pay dividends in order to satisfy the preferences of tax-exempt shareholders: 'The present system of tax credits encourages companies to pay out dividends rather than reinvest their profits' (Chancellor of the Exchequer, 1997).[5] If non-tax factors led tax-exempt shareholders to hold low dividend yield portfolios, such shareholders may have attempted to increase dividend income by temporarily altering their portfolios to include higher dividend yielding shares. A change in portfolio to capture these tax effects may, however, have required investors to deviate from their optimal portfolio, hence, potentially increasing their exposure to risk, *ceteris paribus*. This switch may only have been temporary, but, since the price at which the investor could sell ex-dividend was uncertain, the risk involved was further increased.[6] If the investors intended fully to capture the tax credit they would have needed to hold the share for at least one month in order to comply with anti-avoidance legislation (as discussed below). Trading also, as always, would have incurred transactions costs. Hence, rational investors would only trade to capture dividends if the expected differential taxation-based benefits exceed the expected additional risk and transaction costs involved (Naranjo et al., 2000).

Anti-avoidance legislation exists in both the Republic of Ireland and the UK designed to thwart the tax benefit of very short-term holding of dividend paying shares or 'bond washing' activities.[7,8] When a tax-exempt investor purchases a share and sells it within a month (both transactions being at 'current market price'), and during the period of ownership the share turns ex-dividend the tax credit repayment is reduced by 'an appropriate amount'.[9] Lasfer (1995) comments that these provisions appear to be successful in preventing short-term dividend capture trading. An alternative explanation put forward by Lasfer (1995) is that transactions costs are sufficiently high to deter such activity, and we examine this aspect in Section 6 of the paper. The anti-avoidance legislation was in place in both the Republic of Ireland and the United Kingdom throughout the period under examination in this paper and, therefore, does not affect the *relative* 'tax attractiveness' of dividend income during the phases of the identified natural experiment.

There may be non-tax reasons why institutional investors such as pension funds seek dividends. Short, Zhang and Keasey (2002) observe that 'regardless of the tax bias in favour of dividends, institutions cannot simply rely on capital gains to fund their liabilities and, hence, require dividend payments.' Using a panel of UK companies drawn from 1988–92, they find 'strong support' for the hypothesis of a positive association between dividend payout policy and institutional ownership. An additional consideration is that actuarial valuations of pension fund assets generally are not based directly on quoted market prices; a common method uses projected dividend income (Wilson et al., 2001).[10] The provisions of the Pensions Act 1995, in empowering trustees to make investments without defining the term 'investments', creates uncertainty over the legality of pension funds investing with a view to making a capital gain: a cautious interpretation would permit investment

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[5] The prominence of tax-exempt investors, and particularly pension funds, is evidenced by the significance of their aggregate holdings (22.1% of total UK traded equity was held by pension funds as at 31 December, 1997).

[6] TEPIC investors were required to claim the repayment of the tax credit (rather than receive the dividend gross) and, in the case of dividends from ROICOs, would be paid in Irish Punts pre-1 January 1999 and euros subsequently. Therefore, an additional exchange risk arises from the interval between receiving the dividend and the subsequent tax credit repayment. We thank a referee for pointing this out. In the absence of data detailing when repayment was received by TEPIC investors, conversion to sterling is made at the rate when legal entitlement arises, i.e. the dividend payment date.

[7] The term 'bond washing' is generic to all activities that attempt to 'wash' an underlying security free of the related coupon or dividend payment.

[8] In the Republic of Ireland, the legislation is contained in Section 750 of the Taxes Consolidation Act 1997. The corresponding provisions in the United Kingdom are found in Section 733 of the Income and Corporation Taxes Act 1988.

[9] The reduction being given by:

$$\begin{array}{c}\text{max. potential}\\\text{tax credit}\end{array} \times \frac{\begin{array}{c}\text{period from previous ex-dividend date}\\\text{to one day before date of purchase}\end{array}}{\begin{array}{c}\text{period from previous ex-dividend date}\\\text{to 'current' ex-dividend date}\end{array}}$$

[10] *FRS17 Retirement Benefits*, which came into effect for accounting periods ending after 21 June 2003, requires valuation based on quoted market values for financial reporting purposes.

to be made only with a view to the anticipated income.[11] A continuing preference for dividends would reduce the effectiveness of the abolition of tax credit repayments in achieving a reduction in the pressure on companies to pay dividends to institutional shareholders. Benito and Young (2003) conclude that there is relatively little evidence that the abolition of the tax credit resulted in a reduction in dividends.[12,13]

3. Previous literature: ex-dividend price behaviour

In addition to the amount of dividend, a number of other factors have been identified in the literature as potentially influencing the level of the ex-dividend day fall in share price. In a risk-neutral world without taxes, and abstracting from transaction costs, settlement costs and other market imperfections, the drop in share price when a share turns ex-dividend should equal the dividend paid to shareholders. In other words, the ratio of the price drop to the dividend paid, often referred to as the *drop off ratio* (DOR), should be equal to one. Following the seminal work of Campbell and Beranek (1955), many empirical studies have examined whether or not this hypothesis holds. Elton and Gruber (1970) report that the price drop is more often than not less than the dividend paid and argue that the DOR will only be equal to one if the effective tax rates on dividends and capital gains are the same. They argue that shareholders can choose to sell a share when it is cum-dividend and forego the dividend payment, generating the following cash flows:

$$P_{t-1} - T_G(P_{t-1} - P_p) \tag{1}$$

where the ex-dividend date of the share is at time t; P_{t-1} is the share price at close on the trading day before t; P_p is the price originally paid for the share; and T_G is the rate of taxation on capital gains which the investor faces.

Alternatively, the shareholder may choose to sell the share when it is ex-dividend and generate cash flows, under an imputation system, as follows:

$$P_t - T_G(P_t - P_p) + D\frac{(1 - T_I)}{(1 - T_{TC})} \tag{2}$$

where P_t is the share price on the ex-dividend day; D is the amount of net dividend paid, T_I is the rate of taxation on dividend income and T_{TC} is the rate of imputation tax (equal to the basic rate of tax during the period analysed). Investors will be indifferent between selling cum- or ex-dividend provided expressions (1) and (2) are equal. Assuming this condition, and rearranging the resulting equation, the DOR is given by:

$$\frac{(P_{t-1} - P_t)}{D} = \frac{(1 - T_I)}{(1 - T_G)(1 - T_{TC})} \tag{3}$$

and, hence, the DOR will equal one if and only if $T_I = T_G + T_{TC} - T_G T_{TC}$. Under a classical tax system, such as that in the US, the DOR will equal one if and only if $T_I = T_G$.

Lakonsihok and Vermaelen (1983), Eades et al., (1984), Poterba and Summers (1984), Kaplanis (1986), Barclay (1987), Fedenia and Grammatikos (1993) and Lasfer (1995), among others, also suggest that differential taxation may explain a DOR of less than one. If investors' tax rates are not homogenous, however, arbitrage may occur as investors with relatively favourable income tax rates purchase shares cum-dividend from investors who face heavier income tax rates. If this arbitrage occurs the DOR will, in part, reflect the transaction costs of these short-term investors.

Other posited explanations for DORs being different from one include tick size, settlement costs, uncertainty in ex-dividend prices and market microstructure effects.[14] Bali and Hite (1998) argue that if the dividend payment is not a multiple of the current tick size, then the share price cannot change by the exact amount of the dividend and contend that the ex-dividend price fall will be rounded down to the nearest tick size, tending to deflate the DOR. Lasfer (1995) points out that prior to July 1994 the London Stock Exchange operated a fixed-settlement system under which investors, if they purchased shares at the start of the settlement period, did not have to settle for two weeks. A large proportion of shares tended to go ex-dividend on the first day of the settlement period, hence if an investor purchased a share cum-dividend (at the end of the previous settlement period) they would settle two weeks earlier than if they were to purchase the share ex-dividend. Frank and Jaganathan (1998) examine ex-dividend day pricing in Hong Kong, where neither dividends nor capital gains are taxed, and still find that the DOR ratio tends to be less than one, positing market microstructure as an explanation.

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[11] Section 34 of the Pensions Act 1995 empowers trustees to make investments, but the Act does not define the term 'investment'. Case law provides some clarification, although there is still uncertainty. In Re Wragg (1919) 2 Ch. 55 p.64, 'investment' is defined narrowly as the purchase of property *'in order to be held for the sake of the income it will yield'* (presumably in contrast to trading where the motive may be to purchase an asset with the expectation of subsequent resale at a higher price). Although the courts have recognised new approaches to investment 'putting the emphasis in investment on the making of capital profit at the expense of investment yield' (Marson v. Morton [1986] 1 WLR 1343 at page 1350), the 'cautious approach must be to adopt the strict interpretation set out in Re Wragg in the absence of a more definite definition' (Nabarro Nathanson, 2000).

[12] Discussions with the chief executive officer of a UK listed company confirm that, post-dividend credit abolition, institutional investors funds still 'state' their dividend requirements. This is particularly the case in periods of falling stock market prices when fund investors require dividend income in the absence of significant gains.

[13] Similarly, Oswald and Young (2004) conclude that share buy-backs in the UK are not driven by pension funds' tax considerations, since the abolition of tax credit repayments was not associated with a reduction in the level of buy-backs.

[14] Signalling effects are unlikely to be relevant here, but could explain price changes around dividend announcement days.

Under the imputation system, tax-exempt investors able to reclaim imputed tax credits upon dividends should prefer dividends to capital gains. Hence, we argue that if such tax-exempt investors are the marginal investors, and abstracting from all non-tax imperfections, the DOR should be greater than one. The expected values are as follows: 1.250 and 1.000 in respect of UKCOs' dividends when the UK rate of tax credit repayment was 20% and 0% respectively; and 1.299, 1.266, 1.124 and 1.000 in respect of ROICOs' dividends when the rate of tax credit in Ireland was 23%, 21%, 11% and 0% respectively.[15] One approach to identifying the identity of marginal investors could be to compare actual DORs with the related expected value. Because of the existence of market imperfections in practice, however, expected and observed DORs are likely to differ for non-tax reasons. Under such circumstances, the tax status of the marginal investor can instead be inferred by changes in the observed DOR associated with changes in the rate of tax credit. Bell and Jenkinson (2002) use such an approach in examining a sample of UK dividend events in the period 1 January 1995 to 31 December 1999. A significant fall in the regression estimated DOR post the July 1997 tax credit abolition is consistent with the hypothesis that tax-exempt investors are the marginal investors in UK stocks. Further analysis indicates that this result is related to the level of dividend yield. When Bell and Jenkinson (2002) repeat their analysis based on dividend yield quintiles, the results do not hold for the two lowest quintiles. They attribute this result to dividend clienteles and, implicitly, transaction costs. We examine the issue of transaction costs in Section 6 of the paper.

4. Methodology and data

4.1. Price behaviour

Our initial analysis focuses on the observed univariate DORs following the Elton and Gruber (1970) test statistic. Because of methodological problems with this statistic, however, we also follow the recent literature and adopt a regression based approach to hypothesis testing.[16]

In line with Elton and Gruber (1970), we compare the drop in share price on the ex-dividend day with the net dividend paid as follows:

$$\frac{P_{i,t-1}-P_{i,t}}{D_{i,t}} \tag{4}$$

where, for company i going ex-dividend at time t, $P_{i,t-1}$ and $P_{i,t}$ are, respectively, the closing prices per share on the cum-dividend and ex-dividend days, and $D_{i,t}$ is the net dividend paid per share.

The recent literature focuses, instead, on the slope coefficient, β, in the following regression:

$$P_{i,t-1}-P_{i,t}=\beta D_{i,t}+\varepsilon_i \tag{5}$$

where ε_i is a stochastic error term and other terms are as defined above.

Following Frank and Jaganathan (1998), who argue that a significantly negative intercept is evidence of a market-microstructure effect, we allow for an intercept as follows:

$$P_{i,t-1}-P_{i,t}=\alpha+\beta D_{i,t}+\varepsilon_i \tag{6}$$

In order to examine whether or not the market value of dividends has changed over the various periods within our study, we adapt the Frank and Jaganathan model by including period slope dummies and make estimations via OLS. This estimation is performed separately for dividend events of ROICOs ('the *unscaled* Irish model') and those of UKCOs ('the *unscaled* UK model'). The unscaled Irish model is as follows:

$$\begin{aligned} P_{i,t-1}-P_{i,t} &= \alpha+\beta D_{i,t}+\beta_{BOTH}(BOTH\cdot D_{i,t}) \\ &\quad +\beta_{IRISH21}(IRISH21\cdot D_{i,t})+\beta_{IRISH11}(IRISH11\cdot D_{i,t})+\varepsilon_i \end{aligned} \tag{7}$$

where *BOTH* is a zero-one dummy, equal to one when the ex-dividend day falls in the period prior to 2 July 1997; *IRISH21* is a zero-one dummy, equal to one when the ex-dividend day falls in the period from 2 July 1997 to 2 December 1997 (inclusive); and *IRISH11* is a zero-one dummy, equal to one when the ex-dividend day falls in the period from 3 December 1997 to 31 December 1998 (inclusive). The 'base case' of the model, is, therefore, for ex-dividend days falling in the period following 31 December 1998.

In the UK model, there is no effect from changing rates of Irish dividend tax credit, so the estimated model is simplified to:

$$P_{i,t-1}-P_{i,t}=\alpha+\beta D_{i,t}+\beta_{Both}(BOTH\cdot D_{i,t})+\varepsilon_i \tag{8}$$

where *BOTH* is a zero-one dummy, equal to one when the ex-dividend day falls prior to 2 July, 1997.

We also estimate *scaled* forms of the above models to mitigate any heteroscedasticity concerns and these models, in (9) and (10) below, are termed the 'the *scaled* Irish model' and 'the *scaled* UK model' respectively.[17]

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[15] Calculated as $1/(1-T_{tc})$ where T_{tc} is the rate of tax credit. This calculation abstracts from other factors, as discussed earlier, which may affect the DOR.

[16] The statistic is not normally distributed and is distorted by very small net dividend payments (Bell and Jenkinson, 2002).

$$\frac{P_{i,t-1}-P_{i,t}}{P_{i,t-1}}=\alpha+\beta\frac{D_{i,t}}{P_{i,t-1}}+\beta_{BOTH}\left(BOTH\frac{D_{i,t}}{P_{i,t-1}}\right)+\beta_{IRISH21}\left(IRISH21\frac{D_{i,t}}{P_{i,t-1}}\right)+\beta_{IRISH11}\left(IRISH11\frac{D_{i,t}}{P_{i,t-1}}\right)+\varepsilon_t \quad (9)$$

$$\frac{P_{i,t-1}-P_{i,t}}{P_{i,t-1}}=\alpha+\beta\frac{D_{i,t}}{P_{i,t-1}}+\beta_{BOTH}\left(BOTH\frac{D_{i,t}}{P_{i,t-1}}\right)+\varepsilon_t \quad (10)$$

We estimate each of these four models using both unadjusted and market-adjusted prices, making the market adjustment as follows:[18,19]

$$P_{i,t}=P_{i,t}-P_{i,t-1}\beta_{i,t}R_{m,t} \quad (11)$$

where $R_{m,t}$ is the return on the market on the ex-dividend day, as proxied by the return on the *Financial Times* All-Share Index, and $\beta_{i,t}$ is the equity beta of company i as estimated using the market model and daily returns data over the period 105 to six days prior to ex-dividend day t. Bell and Jenkinson use monthly returns in calculating equity betas, in order to overcome problems with thin trading, whereas we choose to adopt the Scholes and Williams (1977) adjustment. In order to use monthly data to compute the equity beta it is necessary to use returns from a considerably longer period than is the case if daily returns are used: there is a greater chance that the risk characteristics of the company may have changed and, hence, a greater chance that the equity beta may be biased.

We test five hypotheses. The first relates to UKCOs and replicates Bell and Jenkinson (2002) to provide a reference point.

Hypothesis 1: TEPIC investors were the marginal investors in UKCOs prior to the removal of the tax credit on dividends from such investment on the 2 July 1997. As a result, the DOR for the period *Both* in the UK models is significantly greater than that for period *UK0%*.

Hypothesis 2: TEPIC investors were the marginal investors in ROICOs prior to the removal of the tax credit on dividends from such investment on the 31 December 1998. As a result, the DOR for the periods *Both*, *Irish21%* and *Irish11%* in the Irish models are significantly different from that for period *Irish0%*.

Hypothesis 3: TEPIC investors were the marginal investors in ROICOs prior to the reduction in tax credit on dividends from such investment from 21% to 11% on 3 December 1997, but not thereafter. As a result the DOR for the periods *Both* and *Irish21%* in the Irish models are significantly greater than that for period *Irish0%*.

Hypothesis 4: TEPIC investors were not normally the marginal investors in ROICOs prior to 2 July 1997, but were the marginal investors during the period 2 July 1997 to 31 December, 1998 in order to capture the preferential treatment, with respect to the tax credit, afforded to investment in ROICOs. As a result, the DOR for the periods *Irish21%* and *Irish11%* in the Irish models are significantly greater than that for period *Irish0%*; and the DOR for period *Both* is not significantly different from that for period *Irish0%*.

Hypothesis 5: TEPIC investors were not normally the marginal investors in ROICOs prior to 2 July 1997 or after 2 December 1997, but were the marginal investors during the period 2 July 1997 to 2 December, 1997 in order to capture the preferential treatment, with respect to the tax credit at 21%, afforded to investment in Irish resident companies. As a result the implied DOR for the period *Irish21%* in the Irish models is significantly greater than the value for the period *Irish0%*; and the DORs for the periods *Both* and *Irish11%* are not significantly different from that in period *Irish0%*.

4.2. Clustering

To control for potential effects of UKCOs shares going ex-dividend on the same days, that is, concern that residuals may not be independently and identically distributed, the UK model estimations were repeated using portfolios of stocks grouped on the basis of their ex-dividend day. The results do not differ substantially from those set out in the next section. Therefore, in the interests of economy, they are not separately reported in full.[20] Concerning dividend events of ROICOs, 167 of our sample of 236 events (71%) occurred on days absent any other sample dividend events; and only 69 of our sample of events (29%) occurred on days

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[17] We follow the Boyd and Jagannathan (1994) market micro structure model of ex-dividend trading, by including a non-zero undeflated constant in the model rather than including a price-deflated alpha. This is designed to avoid bias in the estimates of the slope coefficients (Bell and Jenkinson, 2002).

[18] We report the results based on market-adjusted prices in the next section. Results based on unadjusted prices are not qualitatively different for the Irish models. For the UK models, slight differences in results based on unadjusted prices in comparison to the main reported results are disclosed by way of a footnote. Full results based on unadjusted prices are available from the authors.

[19] It can be shown that the dividend yield less the deflated adjusted price change is equivalent to the daily abnormal return (AR) estimated using a zero-constant market model and so is similar to an event study approach. We justify focusing on the ex-dividend day only by Menyah's (1993) work which shows that 'unusual' price activity is limited to the ex-dividend day. The use of a zero-constant market model is supported by the results of Cable and Holland (1999), who report a statistically insignificant market model constant term in 20 out of 21 cases.

[20] Full results are available from the authors.

Table 2
Sample selection

	UK resident companies (UKCOs)	*ROI resident companies (ROICOs)*
Number of companies	811	170
Dividend observations with ex-dividend date between 1/1/96 and 31/12/99	5,412	483
LESS (population reduced with steps in the following order):		
dividends from UKCOs paid gross	10	N/A
dividends from UKCOs paid in other than £	8	N/A
dividend observations where the firm is ex-dividend in respect of more than one dividend on a single day	265	4
dividends specified as 'foreign income dividend'	281	0
dividends specified as 'special'	29	3
dividends from investment funds and similar (e.g. investment trusts)	791	8
dividends around whose ex-dividend dates historic prices are not available	0	16
dividends from Irish-registered companies whose London prices are not quoted in £	0	4
Sub-total	4,028	448
LESS: dividend events where there was no share price change on the ex-dividend day	257	171
LESS: dividend events where the declaration and payment dates straddle changes in availability in dividend tax credit repayment to TEPIC investors	126	41
Number of dividend observations in sample for price behaviour	3,645	236

on which there was one or more other sample dividend event. Therefore, re-estimation of the Irish models to allow for clustering was not considered necessary.

4.3. Data

The analysis employs Datastream sourced data on the dividend events of ROICOs and UKCOs listed on either the Dublin or London stock exchanges. Datastream list 'FTAL99' (list of FTSE All Share Index constituents in 1999) yielded 811 UKCOs as listed on the LSE in 1999. London listed ROICOs were identified using Datastream lists 'FLON' (all non-UK registered companies listed on the LSE) together with list 'DEADIR' ('dead' Irish companies) to yield 57 companies. Dublin listed ROICOs were identified using Datastream lists 'EIRE' (Company Accounts), 'FIRL' (Research Stocks) and 'DEADIR', yielding 113 companies.

Starting with the population of all these companies' dividend events during the period 1996 to 1999 (inclusive), reductions were made for 'unusable events' as per Table 2, to give a useable sample of 4,028 UKCOs' dividend events and 448 ROICOs' dividend events. For each of these events, the ex-dividend date fell during the period 1 January 1996 to 31 December 1999, and share price information was available for the period from 105 days prior to the ex-dividend date through to the ex-dividend date.

To avoid problems associated with thin trading of company shares, and following Bell and Jenkinson (2002), who point out that although no price change is observed if there is no trade on the ex-dividend day the price might change when the share is traded later, it is appropriate to include in the DOR and regression analyses only dividend events where the stock was traded on the ex-dividend day. Therefore, we exclude dividend events where there was no share price change on the ex-dividend day. Finally, we exclude from the samples dividend events where the declaration and payment dates straddle changes in availability or level of dividend tax credit repayment to TEPIC investors. That is, dividends declared by ROICOs or UKCOs before 2 July 1997 and paid on or after that date; dividends declared by ROICOs before 3 December 1997 and paid after that date; and dividends declared by ROICOs before 6 April 1999 and paid after that date. As per Table 2, this results in samples of 3,645 UKCO dividend events and 236 ROICO dividend events for which basic statistics and DOR are calculated and on which regression estimation is performed.

Table 3 reports descriptive statistics for the samples of dividend events of UKCOs and ROICOs, in each case in aggregate and by tax credit regime. In both samples the main feature is the high standard deviation of the DORs relative to their mean values and differences between the respective mean and median values. Consequently, the following discussion of the univariate statistics will employ both parametric and non-parametric analysis. For the UKCOs, the mean and median DOR for the period *Both* are significantly greater than those for the period *UK0%*. Using parametric and non-parametric tests the differences are significant at the 10% and 1% levels respectively, as shown in Table 4.[21] These results are consistent with the availability of tax credit being valued by the marginal investor prior to its abolition in July 1977.[22]

With respect to the Irish companies, the DOR for the period *Irish21%* is the only one that is significantly greater than the *Irish0%* DOR. Using parametric and non-parametric tests the differences are significant at the 10% and 1% levels. This suggests that the Irish tax credit repayment was only valued by marginal investors in period *Irish21%*.[23] Earlier, when the repayable tax credit was also available on UKCOs shares, and, subsequently, when the repayment was restricted to a reduced rate of 11%, there is no evidence that the tax credit was valued by the marginal investor. Only the DOR in the *Both* period, however, is significantly smaller than its theoretical level, as shown in Table 4.

5. Empirical results

The results of the OLS estimations along with diagnostic statistics are summarised in Tables 5 and 6. Four versions of both the unscaled models (Table 5) and scaled models (Table 6) are reported: a 'basic' model, a 'transformed' dependent variable model, an 'influential' model and a 'trimmed' model.

The basic standard unscaled and scaled models are based on the full sample of observations and estimated using untransformed variables. These models exhibit high levels of non-normality. Such can be as a result of non-normality in the dependent variable (Rawlings, 1988). In our data the main form of departure from non-normality is kurtosis, specifically the residuals are leptokurtic or peaked.[24] While it can be argued that with a sufficiently large sample size this should not be a cause for concern, we assess the sensitivity of the reported results by employing a transformation of the dependent variable. In order to 'broaden' the distribution we employ a cube root transformation of the dependent variable about its mean to estimate a transformed model (Rawlings, 1988). In the case of the unscaled models the resulting transformed models exhibit a non-significant Jarque-Bera statistic for both the UKCOs and ROICOs. When the transformation is applied to the scaled models the resulting Jarque-Bera statistics, albeit reduced by more than 99%, remain significant.

Although, as expected, the level of heteroskedasticity is reduced when the scaled approach is adopted, where Breusch-Pagan test statistics indicate significant departures from the assumption of homoskedastic variances the reported t-statistics incorporate the White (1980) adjustment.

To assess the sensitivity of the models to the presence of 'influential' observations, a third model in each setting has been estimated. These are based on a reduced sample having excluded observations with a DFITS statistic in excess of the critical value, and are termed 'influential' (Belsley et al., 1980).[25] As a final assessment of the sensitivity of the estimations to unrepresentative observations a fourth set of models is reported. These are termed 'trimmed', and exclude all observations when the observed DOR is in excess of an arbitrary absolute value of 5.[26]

The following commentary will focus on the results of the basic models, with reference to the transformed, influential and trimmed models only where the results conflict. The results of the unscaled regressions are shown in Table 5 and the

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[21] These significance levels correspond to those reported by Bell and Jenkinson (2002), who report mean DORs of 0.841 and 0.732 for the pre and post July 1997 periods they examined.

[22] Consistent with this conclusion, the mean AR for period *UK0%* (0.378%) is significantly greater than the value for period *Both* (0.203%) at the 1% level based on the t-test (t=2.471) and Mann-Whitney test (z=3.680) respectively.

[23] Consistent with this conclusion, the mean AR for the period *Irish21%* (–0.361%) is significantly less than the value for *Irish0%* (0.512%) at the 10% and 1% level based on the t-test (t=1.604) and Mann-Whitney test (z=2.374) respectively. Neither of the mean ARs for the other two periods are significantly different from that in period *Irish0%* at generally acceptable levels of significance.

[24] For the sample of UK firms, kurtosis statistics of 135.230 and 24.273 occurred in the unscaled and scaled measures of the dependent variable respectively. The issue was less problematic in the Irish sample, where the corresponding figures were 2.573 and 5.952 respectively.

[25] The critical value is calculated as $2x\sqrt{p/n}$, where p is the number of independent variables plus one, and n is the number of observations (Belsley et al., 1980).

[26] Alternative cut-off points in the range 2–7 give similar results.

Table 3
Descriptive statistics

Panel A: ROICOs

Period		*All*	*Both*	*Irish21%*	*Irish11%*	*Irish0%*
Number of dividend events		(236)	(88)	(20)	(65)	(63)
Cum-dividend price	mean	255.2	243.8	218.9	249.1	282.1
	median	179.3	180.0	160.5	190.0	201.8
	st. dev	191.6	177.2	181.4	180.1	222.9
Net dividend	mean	3.571	3.870	2.248	3.244	3.909
	median	2.610	2.962	1.591	2.513	2.864
	st. dev	2.899	2.729	1.854	2.614	3.519
Adjusted price drop	mean	2.941	2.486	3.895	3.738	2.452
	median	2.289	2.395	3.846	2.269	1.806
	st. dev	9.473	4.975	3.509	13.841	10.119
Dividend yield	mean	0.014	0.015	0.010	0.012	0.016
	median	0.011	0.014	0.007	0.009	0.012
	st. dev	0.014	0.009	0.007	0.018	0.016
Price drop ratio (DOR)	mean	1.231	0.503	2.106	2.138	1.035
	median	0.925	0.918	1.642	0.977	0.774
	st. dev	7.127	1.812	2.589	13.086	2.677
$(P_0-P_1)/P_0$	mean	0.011	0.010	0.014	0.011	0.011
	median	0.011	0.011	0.013	0.008	0.010
	st. dev	0.029	0.020	0.021	0.043	0.025

Panel B: UKCOs

Period		*All*	*Both*	*UK0%*
Number of dividend events		(3,645)	(1,265)	(2,380)
Cum-dividend price	mean	420.72	399.22	432.15
	median	321.00	320.00	322.25
	st. dev	391.35	338.41	416.38
Net dividend	mean	5.344	5.289	5.373
	median	3.900	3.800	3.900
	st. dev	5.149	4.937	5.258
Adjusted price drop	mean	4.273	4.929	3.924
	median	2.984	3.300	2.814
	st. dev	14.532	13.725	14.935
Dividend yield	mean	0.015	0.015	0.015
	median	0.013	0.013	0.013
	st. dev	0.012	0.008	0.012
Price drop ratio (DOR)	mean	0.664	0.791	0.596
	median	0.875	0.925	0.847
	st. dev	4.819	2.390	5.700
$(P_0-P_1)/P_0$	mean	0.012	0.013	0.011
	median	0.012	0.012	0.011
	st. dev	0.024	0.021	0.025

Table 4
Significance of difference between the drop-off ratio as between sub-period samples and in comparison to theoretical values

Panel A: ROICOs

		t-statistic	*Mann-Whitney U (Z)*
Both with *Irish0%*	(1-tail)	1.456*	–0.321
Both with *Irish11%*	(1-tail)	1.000	–0.657
Both with *Irish21%*	(1-tail)	–2.627***	–2.871***
Irish21% with *Irish11%*	(1-tail)	0.011	1.699**
Irish21% with *Irish0%*	(1-tail)	1.599*	2.364***
Irish11% with *Irish0%*	(1-tail)	0.666	–0.608
Both with 1.299	(1-tail)	4.121***	
Irish21% with 1.266	(1-tail)	1.451*	
Irish11% with 1.124	(1-tail)	0.625	
Irish0% with 1.000	(1-tail)	0.103	

Panel B: UKCOs

		t-statistic	*Mann-Whitney U (Z)*
Both with *UK0%*	(1-tail)	1.298*	–2.986***
Both with 1.25	(1-tail)	6.799***	
UK0% with 1	(1-tail)	3.451***	

*, ** ,*** indicate significance levels of 10%, 5% and 1% respectively.

scaled regression results are shown in Table 6. The coefficients for the dummy interaction variables indicate the extent of the difference in value of the underlying variable for a particular time period compared to the base time periods, *UK0%* for the UK models and *Irish0%* for the Irish models. For example, the coefficient of 0.828 for β_1 in Table 5 for the UK basic model is the implied DOR for period *UK0%*. The coefficient 0.3511 for the interaction variable β_{Both} indicates that the implied DOR is 0.3511 higher for period *Both*; that is, the implied DOR for period *Both* is 1.1791. The significance levels in Tables 5 and 6 for the interaction variables test whether there is a significant difference in the DOR for each period compared to that in the base period. The implied DORs are then presented in Table 7 and are compared to their theoretical values. The following refers to both sets of tables.[27]

In the UK model, DOR for the pre-2 July 1997 period *Both* is significantly greater than its post 2 July 1997 value in all settings for both the unscaled and scaled models except for the trimmed scaled model, as shown by coefficients for β_{Both} which are significantly greater than zero in Tables 5 and 6.[28] The implied DORs range from 0.827 to 1.179 in period *Both* and then fall to a range from 0.478 to 0.903 in period *UK0%*. These values compare with a fall from 0.890 to 0.784 as reported by Bell and Jenkinson. The results support Bell and Jenkinson's conclusions that prior to the abolition of the repayable tax credit in July 1997 TEPIC investors valued the UK dividend tax credit when pricing shares. This suggests that either they had a preference for dividends or that they were indifferent but were attracted by the availability of the tax credit. This evidence leads to an acceptance of hypothesis 1. The intercept in the regression analysis is significantly negative for the UK scaled model but is not significantly negative in the *unscaled* model with the exception of the transformed model. Notwithstanding the latter, the former suggests there is some evidence of non-tax transaction costs or frictions.

The situation with respect to ROICOs, when assessed using the unscaled Irish models, suggests that the tax credit was valued only in the period when it was repayable at the rate of 21% and no tax credit repayment was available in respect of UKCOs dividends. This is evidenced by significantly greater than zero coefficients for $\beta_{Irish21}$ in Table 5; and the fact that the DOR does not significantly differ in either period *Both* or *Irish11%* from that when no tax credit was available. The results are only supported in one of the scaled models, the influential model, and then only at the 10%

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[27] Implied DORs have not been computed for the 'transformed model' as the coefficients cannot be directly compared to their theoretical levels.

[28] When the dependent variable is unadjusted for market movements the *Both* coefficient in the scaled UK basic model is not significant at the 10% level; see footnote 18.

Table 5
Regression estimation results – unscaled models

Irish model: $P_0 - P_1 = \beta_0 + \beta_1 D + \beta_{BOTH} BOTH * D + \beta_{IRISH21} IRISH21 * D + \beta_{IRISH11} IRISH11 * D + \varepsilon$

UK model: $P_0 - P_1 = \beta_0 + \beta_1 D + \beta_{BOTH} BOTH * Div + \varepsilon$

where P_0 and P_1 are, respectively, the cum-dividend and the ex-dividend share price; D is net dividend; *BOTH* is a dummy variable, being 1 when the ex-dividend day occurred prior to 2 July 1997 and 0 otherwise; *IRISH21* is a zero-one dummy, equal to one when the ex-dividend day falls in the period from 2 July, 1997 to 2 December 1997 (inclusive); and *IRISH11* is a zero-one dummy, equal to one when the ex-dividend day falls in the period from 3 December 1997 to 31 December 1998 (inclusive). The t-statistics are in parentheses and test whether the coefficient is different from zero.

	ROICOs				*UKCOs*			
	Basic	*Transformed*	*Influential*	*Trimmed*	*Basic*	*Transformed*	*Influential*	*Trimmed*
β_1	0.1274 (0.1667)	0.1442 (2.434***)	0.4462 (2.409***)	0.1023 (0.1337)	0.828 (7.784***)	0.1227 (14.69***)	0.4783 (4.915***)	0.7524 (7.586***)
β_{Both}	0.4751 (0.7688)	0.0559 (0.9617)	0.2489 (1.358)	0.4696 (0.7629)	0.3511 (1.973**)	0.0321 (3.431***)	0.3484 (4.591***)	0.2175 (2.567***)
$\beta_{Irish21}$	1.2261 (2.153**)	0.3005 (3.459***)	1.0798 (3.353***)	1.2035 (2.142**)	n/a	n/a	n/a	n/a
$\beta_{Irish11}$	1.3776 (1.493)	0.0581 (0.9297)	0.1718 (0.6107)	1.4115 (1.533)	n/a	n/a	n/a	n/a
Constant	0.3362 (0.2639)	–0.8341 (–6.17***)	0.5056 (1.068)	0.5129 (0.4051)	–0.7965 (–1.466)	–0.9561 (–23.81***)	0.2129 (0.5865)	–0.1371 (0.3951)
N	236	236	223	233	3,645	3,645	3,594	3,557
R^2 (adj)	7.84%	16.39%	8.83%	8.37%	11.72%	22.65%	8.37%	15.48%
F-statistic	6.001*** (4, 231)	12.518*** (4, 231)	6.374*** (4, 218)	6.301*** (4, 228)	242.93*** (2, 3642)	533.25*** (2, 3642)	165.18*** (2, 3591)	326.67*** (2, 3554)
Breusch-Pagan	558.17*** (4)	23.05*** (4)	18.933*** (4)	618.99*** (4)	5,023.46*** (2)	488.09*** (2)	2,091.92*** (2)	5,881.67*** (2)
Jarque-Bera ~ $\chi^2(2)$	7,598.79***	1.04	283.52***	8,855.70***	>99,999***	3.261	>99,999***	>99,999***

*, ** ,*** indicate significance levels of 10%, 5% and 1% respectively.

Table 6
Regression estimation results – scaled models

Irish model: $$\frac{P_0 - P_1}{P_0} = \beta_0 + \beta_1 \frac{D}{P_0} + \beta_{BOTH} BOTH \frac{D}{P_0} + \beta_{IRISH21} IRISH21 \frac{D}{P_0} + \beta_{IRISH11} IRISH11 \frac{D}{P_0} + \varepsilon$$

UK model: $$\frac{P_0 - P_1}{P_0} = \beta_0 + \beta_1 \frac{D}{P_0} + \beta_{BOTH} BOTH \frac{D}{P_0} + \varepsilon$$

where P_0 and P_1 are, respectively, the cum-dividend and the ex-dividend share price; D is net dividend; *BOTH* is a dummy variable, being 1 when the ex-dividend day occurred prior to 2 July 1997 and 0 otherwise; *IRISH21* is a zero-one dummy, equal to one when the ex-dividend day falls in the period from 2 July, 1997 to 2 December 1997 (inclusive); and *IRISH11* is a zero-one dummy, equal to one when the ex-dividend day falls in the period from 3 December 1997 to 31 December 1998 (inclusive). The t-statistics are in parentheses and test whether the coefficient is different from zero.

	ROICOs				*UKCOs*			
	Basic	*Transformed*	*Influential*	*Trimmed*	*Basic*	*Transformed*	*Influential*	*Trimmed*
β_1	0.8467 (6.183***)	4.4538 (2.164**)	0.6005 (3.298***)	0.9071 (6.202***)	0.9036 (25.482***)	11.243 (4.369***)	0.8630 (22.62***)	0.8782 (22.72***)
β_{Both}	0.0268 (0.178)	0.2315 (0.0836)	0.1909 (1.282)	0.0641 (0.4267)	0.0773 (1.465*)	3.3814 (3.338***)	0.0721 (1.413*)	0.0621 (1.191)
$\beta_{Irish21}$	0.0794 (0.1206)	3.0460 (0.4712)	0.7531 (1.758*)	0.1550 (0.2271)	n/a	n/a	n/a	n/a
$\beta_{Irish11}$	0.3237 (1.225)	–0.2707 (–1.047)	0.2163 (0.8776)	0.8979 (1.128)	n/a	n/a	n/a	n/a
Constant	–0.0024 (–1.084)	–0.0611 (–1.924)	0.0009 (0.3942)	–0.0044 (–1.257)	–0.0022 (–3.065***)	–0.1853 (–5.481***)	–0.0022 (–3.133***)	–0.0139 (–2.128**)
N	236	236	224	233	3,645	3,645	3,603	3,557
R^2 (adj)	22.48%	1.2%	10.04%	16.32%	19.26%	17.33%	15.19%	22.07%
F-statistic	18.04*** (4, 231)	2.17* (4, 231)	7.220*** (4, 219)	12.32*** (4, 228)	435.52*** (2, 3642)	382.87*** (2, 3642)	323.655*** (2, 3600)	504.49*** (2, 3554)
Breusch-Pagan	74.37*** (4)	2.18 (4)	16.371*** (4)	270.39*** (4)	15.29*** (2)	1,690.12** (2)	21.432*** (2)	159.92*** (2)
Jarque-Bera ~ $\chi^2(2)$	5,178.73***	24.80***	58.99***	4022.60***	79,085.54***	782.93***	99,687.6***	>99,999***

*, ** ,*** indicate significance levels of 10%, 5% and 1% respectively.

Table 7
Implied DORs obtained from the regression analysis for each of the periods analysed

		Unscaled			*Scaled*		
	Theoretical value	*Basic*	*Influential*	*Trimmed*	*Basic*	*Influential*	*Trimmed*
Irish model:							
Irish0%	1.000	0.1274	0.4462	0.1023	0.8467	0.6005	0.9071
		(–1.141)	(–2.991***)	(–1.173)	(–1.1194)	(–2.1939**)	(–0.6351)
Both	1.299	0.6025	0.6950	0.5719	0.8735	0.7914	0.9712
		(–2.4935***)	(–4.836***)	(–2.6131***)	(–3.223***)	(–4.1675***)	(–1.793*)
Irish21%	1.266	1.3535	1.5259	1.3058	0.9261	1.3535	1.0621
		(0.2141)	(0.8152)	(0.0987)	(–0.505)	(0.1975)	(–0.284)
Irish11%	1.124	1.505	0.6179	1.5138	1.1704	0.8168	1.805
		(0.4628)	(–2.050**)	(0.4735)	(0.2050)	(–1.2348)	(0.777)
Irish21% vs. 11%		–0.1515	0.908	–0.208	–0.2443	0.5367	–0.7429
		(–0.222)	(2.4423***)	(–0.3073)	(–0.3493)	(1.1721)	(–0.7942)
UK model:							
UK0%	1	0.828	0.478	0.753	0.9035	0.863	0.878
		(–1.616*)	(–5.361***)	(–2.496***)	(–2.719***)	(–3.590***)	(–3.151***)
Both	1.25	1.179	0.827	0.969	0.9808	0.935	0.940
		(–0.348)	(–7.700***)	(–4.269***)	(–4.1581***)	(–4.687***)	(–4.849***)

*, ** ,*** indicate significance levels of 10%, 5% and 1% respectively; *t*-statistics testing difference from theoretical values

level.

The results in Table 7, however, show that the implied DORs are not significantly different from their theoretical values in any period except period *Both* – where the implied value is significantly less than the theoretical level. These results suggest that in the case of periods *Irish21%* and *Irish11%* the marginal investor valued the tax credit. The lack of significance in Tables 5 and 6 for period *Irish11%*, however, weakens the strength of such an argument. We can conclude that in period *Both* there is no evidence supporting the conclusion that the marginal investor in ROICOs was a TEPIC investor; and that there is little evidence of such in period *Irish11%*. There is evidence, however, that when the rate of Irish tax credit was at its maximum, 21%, the valuation of dividends reflected the value of the tax credit to TEPIC investors, although this conclusion is qualified in that the effect was only observed in the unscaled Irish models. This evidence leads to an acceptance of hypothesis 5 and by implication rejection of hypotheses 2, 3 and 4. The apparent evidence of a valuation effect when the tax credit was 21% coupled with the absence of an effect when the tax credit was reduced to 11% suggests a cost-benefit trade off on the part of TEPIC investors. The next section investigates further the relationship between the rate of tax credit and transactions costs as a potential inhibitor to TEPIC investors valuing dividend tax credits.

6. Analysis of dividend credit yield, dividend yield and transactions costs

The inference from our results that TEPIC investors did seek to capture the dividends from ROICOs when the rate of Irish tax credit was 21%, but not when it was 11% suggests the following. Consider an investor investing an amount I in an Irish resident stock cum-dividend in order to capture the dividend tax credit; and assume that total expected transactions and portfolio restructuring costs are viewed by the investor as a percentage, t, of I. Assuming investment *purely* in order to capture the value of the dividend tax credit, and using our finding above, total transactions and portfolio restructuring costs to the investor will be less than the value of the dividend tax credit at 21%, but more than the value of the tax credit at 11%. More formally:

$$\left(\frac{I}{p}d\right)\frac{21}{79} > It > \left(\frac{I}{p}d\right)\frac{11}{89} \qquad (12)$$

where p represents the market price per share cum-dividend; d is the rate of dividend per share; and the left-most and right-most terms of the inequality represent the value of tax credit captured for an amount I invested cum-dividend where the dividend tax credit rate is, respectively, 21% and 11%.

Expression (12) simplifies to:

$$Y\frac{21}{79} > t > Y\frac{11}{89} \qquad (13)$$

where Y represents the rate of dividend yield based on cum-dividend market price.

Expression (13) may be generalised to allow for any percentage rate of tax credit, r, as follows, to give a general rule, under this analysis, for expected value adding tax credit capture:

$$Y\frac{r}{100-r} > t \qquad (14)$$

We term the left hand side of this inequality 'dividend credit yield'. One implication of this expression is that investment activity undertaken in order to capture dividend tax credits be restricted to stocks with high dividend yield, consistent with the discussions and analyses of Lakonishok and Vermaelen (1986), Bell and Jenkinson (2002), and others; or with a high rate of dividend tax credit; or some combination of these. This, therefore, speaks further for the results obtained above, given, as we have, heterogeneity with respect to dividend yield in each of our sub-period samples.

We now consider dividend events of UKCOs and ROICOs during period *Both* together with dividend events of ROICOs during periods *Irish21%* and *Irish11%* (that is all those events that may be subject to tax credit-related dividend capture). Dividend events where the market-adjusted DOR is less than 0.5 or greater than 1.5 are removed as outliers where non-tax credit factors are clearly at work,[29] leaving a sample of 471 dividend events from UKCOs and ROICOs. For each dividend event in this sample, the value of the dividend tax credit yield,

$$Y\frac{r}{100-r}\ ,$$

is calculated, where r is the rate of tax credit. This represents that value of the dividend tax credit as a proportion of the amount invested. The sample is then divided into two: sub-sample A, containing dividend events for which the credit yield is greater than or equal to some value, x; and sub-sample B containing dividend events for which the credit yield is less than x. This for x ranging from 0.6% to 1.0% in increments of 0.01%. Given that higher DOR indicates a higher propensity to dividend capture, we consider the significance with

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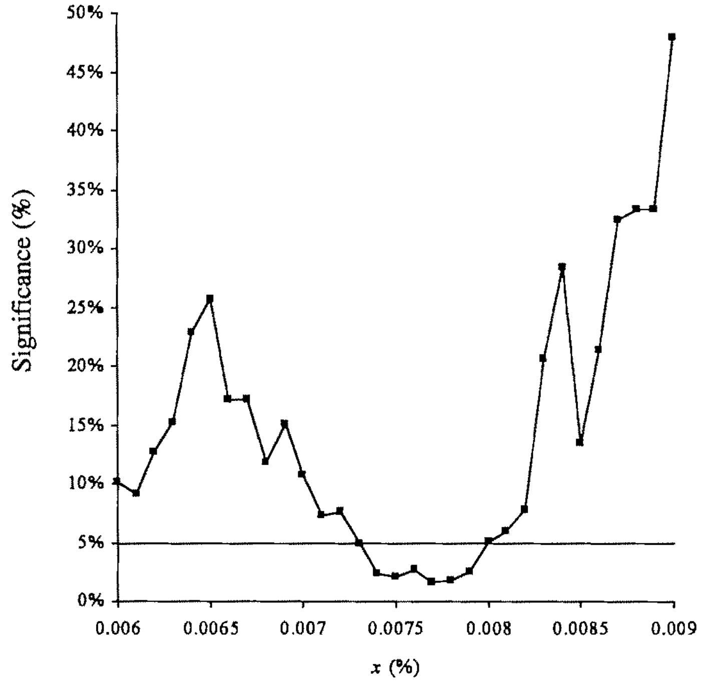
[29] The minimum DOR expected when abstracting from all factors other than dividend tax credit would be 0.75 (assuming the UK higher rate of personal taxation at 40%); and the maximum DOR expected would be 1.299 (assuming full tax credit availability to tax exempt investors). The cut-offs used are slightly wider than these theoretical bounds.

Figure 1
Sample divided into two sub-samples, each dividend event being assigned to sub-sample *A* if *Yr*/(100–*r*) is greater than *x*, and to sub-sample *B* if this quantity is less than *x*: significance with which the hypothesis that the mean DOR for sub-sample *A* is greater than that for sub-sample *B* for various values of *x*



which we may conclude that the mean DOR in sub-sample *A* exceeds that of sub-sample *B* over the range of *x* and seek the value(s) of *x* where a clear separation is apparent. Figure 1 indicates the level of significance with which the mean DOR for sub-sample *A* exceeds that for sub-sample *B*. From the figure it is clear that the level of significance is low for values of *x* up to and including 0.73%; whereas significance at 5% or less is evident for *x* between 0.74% and 0.79% (inclusive). Minimum significance (at the 1.6% level) is achieved when *x* is 0.77%. Therefore, we conclude that propensity to capture dividends is heightened when dividend tax credit yield is in the order of 0.8%. Per expression (14), this must exceed the rate of overall transactions and portfolio adjustment costs faced by the investor, in order for us to maintain the assumption, made in deriving expression (14), of investment *purely* in order to capture the value of the dividend tax credit. The 0.8% we have deduced, is, however, significantly lower than the upper bound on trading costs of 1.80% suggested by James (2000).[30] Therefore, we must conclude that, while capture dividend tax credit repayments offset the overall costs of trading by TEPIC investors, it cannot wholly explain their trading decisions in general; and non-taxation-based incentives, as set out in Section 2, pertain.

Finally, turning to dividend yield itself, the value of yield grossed-up for dividend tax credit,

$$Y\frac{100}{100-r},$$

is calculated. The sample is then divided into two, with sub-sample *A* containing dividend events for which the grossed-up yield is greater than or equal to some value, *x*; and sub-sample *B* containing dividend events for which the grossed-up yield is less than *x*. This for *x* ranging from 0.5% to 4.0% in increments of 0.1%. We again consider the significance with which we may conclude that the mean DOR in sub-sample *A* exceeds that of sub-sample *B* over the range of *x* and seek the value(s) of *x* where a clear separation is apparent. As shown in Figure 2 the level of significance is low for values of *x* up to and including 2.3%; but significant at a level of 10% or more for *x* greater than 2.4% (with exceptions when *x* is 3.0, 3.2 and 3.3%). Minimum significance (at the 0.3% level) is achieved when *x* is 2.6%. Therefore, we conclude that propensity for dividend capture is heightened when gross dividend yield is of the order of 2.6% and above.

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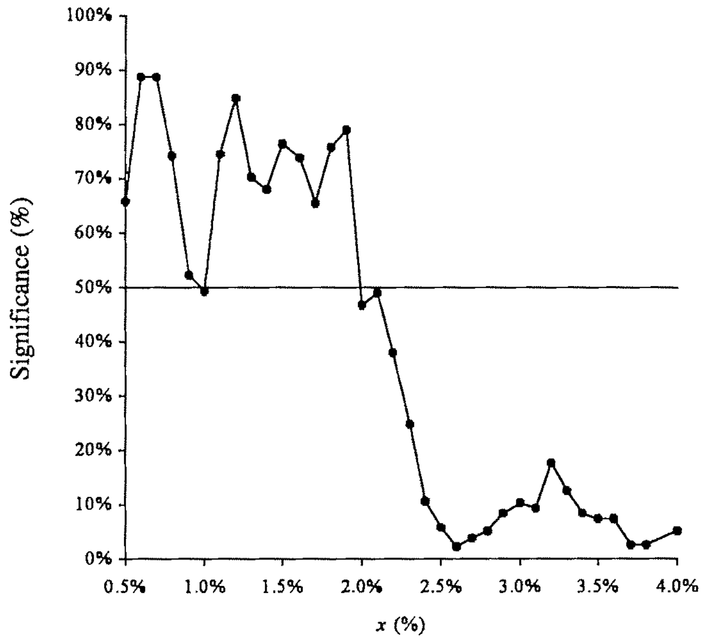
[30] Comprising: commission 0.30%; bid / offer spread 0.75%; price impact 0.25%; and stamp duty 0.50%.

Figure 2

Sample divided into two sub-samples, each dividend event being assigned to sub-sample *A* if *Y*100/(100–*r*) is greater than *x*, and to sub-sample *B* if this quantity is less than *x*: significance with which the hypothesis that the mean DOR for sub-sample *A* is greater than that for sub-sample *B* for various values of *x*



7. Summary and conclusions

We examine the market valuation of dividends from UKCOs and ROICOs listed on the Dublin and London stock exchanges and the propensity of investors to capture those dividends, over the distinct contiguous phases of a 'natural experiment' – during which the availability of dividend tax credit repayment to UK pension funds and UK insurance company tax exempt pension businesses (TEPIC investors) was changed. Our samples are based on the population of all listed UKCOs' and ROICOs' dividend events with an ex-dividend date between 1 January 1996 and 31 December 1999, with sample reduction owing only to methodological necessity and data availability.

The Irish data suggests that TEPIC investors were, in the main, the marginal investors in ROICOs around ex-dividend days where there was the entitlement to re-claim a dividend tax credit at 21% of gross dividend from such stocks. There is little evidence that TEPIC investors were the investors in ROICOs during any other period. The data in respect of UKCOs confirms the results of Bell and Jenkinson (2002), that the marginal investors were, in the main, TEPIC investors, and that the DOR dropped significantly following the removal of the tax credit upon UKCOs company dividends.

By analysis of yield and available tax credit repayment, we deduce that propensity to capture dividends by TEPIC investors is heightened when the dividend tax credit yield is of the order of 0.8% or more; and dividend yield is of the order of 2.6% or more. The result for dividend tax credit yield suggests that, while dividend tax credit capture does offset overall transactions and portfolio readjustment costs, taxation considerations do not drive trading decisions. We find that dividend capture is sometimes affected when it appears, under a pure transaction cost versus value of tax credit analysis, to be not worthwhile; and, conversely, that dividend capture is sometimes foregone when it appears, under the same analysis, to be worthwhile. This is consistent with the existence of company-specific investment considerations, and investor-specific expectations as regards trading transactions costs and increasing risks arising as a result of moving from otherwise optimal portfolios. It is also consistent with investors maximising after tax return, rather than focusing on specific taxation effects.

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The road to uniformity: accounting change in UK voluntary hospitals

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Abstract—This paper explores the development and spread of the uniform system of accounts in United Kingdom voluntary hospitals in the period 1880–1920. The antecedent contextual factors are first established and include the growth of hospital care, changes in its nature, together with the emergence of the concepts of managerialism and efficiency. These factors are identified as important in stimulating the interest of external groups and institutions that were influential in raising the issue of accounting change. However, powerful individuals and groups within the voluntary hospital movement were able to control accounting reform and negate the power of external institutions, thereby successfully excluding the accounting profession from the development of uniform accounts. The paper further examines the subsequent spread of the uniform accounts and finds that economic power and professional and technological forces interacted to achieve a high degree of conformity of accounting practice within voluntary hospitals. This was achieved without the direct intervention of the State. Finally, the paper suggests that hospitals in the US followed the UK with their own uniformity drive.

1. Introduction

Attempts to use accounting data to compare hospital performance have a long history in UK public sector hospitals. For example, departmental costing in 1956 (Montacute, 1962), Magee and Osmolski's (1978) pilot study of speciality costing and its introduction throughout the NHS after 1984 (Körner, 1984), and costing for contracts introduced with the internal market in 1989 (Ellwood, 1990). This has continued into the early years of the 21st century with the production of unit cost information based on a classification known as Healthcare Related Groups (Jones, 1999). This paper explores a much earlier, pre-nationalisation, attempt to develop uniform accounting data, and examines the emergence, and spread, of these accounts in the UK voluntary hospital sector in the period 1880 to 1920.

A number of authors attribute the origin of uniform accounts to Sir Henry Burdett (Abel-Smith, 1964; Maggs, 1983, 1987; Rivett, 1986; Jones and Mellett, 2000). This paper suggests uniform accounts surfaced within the context of the changing nature, and funding, of hospital care, increasing professionalisation and early managerialism (Sturdy and Cooter, 1998). These elements led to an intensive debate on the organisation and management of voluntary hospitals, and external institutions were able to mobilise a number of forces, and concepts, such as inadequate governance and inefficiency, and raise the possibility of political intervention to help generate change. Partly in response to this, internal groups and institutions took responsibility for accounting reform by introducing Burdett's uniform system of accounts of 1893, and largely succeeded in excluding external institutions from hospital management and accounting. Burdett was certainly crucial in the change process, and in the subsequent spread of the uniform system, but his role as initiator is debatable.

The drive towards uniformity in accounts can be traced to 1849 in UK railway companies, with legislation eventually introduced in 1868 (Parker, 1984). This was followed by 'prescribed formats' for life assurance (1870) and gas companies (1871), but attempts, at this time, to extend uniformity were unsuccessful, and opposed by legislators (Parker, 1984). Within the voluntary hospitals there were a number of uniform accounting schemes proposed in the late 1880s and early 1890s. The Institute of Chartered Accountants' in England and Wales (ICAEW), working with the Charity Organisation Society (COS), proposed a uniform accounting format in 1890. These accounts were not adopted but were usurped, in 1893, by Burdett's book *The uniform system of accounts for hospitals and public institutions, orphanages, missionary societies, homes, co-operations, and all classes of institutions*. Often referred to as Burdett's uniform accounts, they were

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subsequently adopted by a majority of the (larger) UK voluntary hospitals.

The main objective of this paper is to explore the contextual factors driving change, to track the process of change and the spread of uniform accounts. At each stage the role of leading opinion formers – individuals, groups and institutions – are analysed, within the context of broader social, economic and technological concepts and forces. Of particular interest is the manner in which internal groups, associated with the voluntary hospital movement, resisted external 'interference' from outside groups and institutions. These internal agents established uniformity of information and disseminated comparative hospital cost data, with limited intervention from the state or the accounting profession.

2. Contextual and processual change

The approach to historical investigation adopted in this paper is analogous to that which accounting scholars label 'contextual' (Hopwood, 1983, 1987; Napier, 1989) and more recently 'processual' (Guthrie, 1994; Burns, 2000). Bhimani (1993) considers that in contextual studies, 'accounting is a social practice subject to being influenced by a wide array of forces and itself effecting social changes of its own account' (Bhimani, 1993:3). There is a well-established and wide-ranging literature of accounting change in its context (Burchell et al., 1985; Loft, 1986; Hopwood, 1987) and it is increasingly recognised that examining accounting change over a long timeframe, with a detailed analysis of the decision-making processes can provide a fuller understanding of how accounting practice is devised and implemented (Hopwood, 1983; Bhimani, 1993; Guthrie, 1994; Ryan, 1999; Burns, 2000; Scott et al., 2003). As Burns (2000) states, this focus, on context and process, has also been a preoccupation for researchers of strategic organisational change and many of their ideas can be applied to accounting history (Pettigrew, 1987; Pettigrew et al., 1992; Dawson, 2003). For example, Pettigrew argues that the processual approach examines 'the long term pattern of events by which strategies are conceived and their competitive purposes put into operation' (Pettigrew, 1987:19), and that organisational change cannot be seen 'as discrete episodes divorced from the antecedents in the firm' (1987:16).

This paper adopts a processual perspective and uses an approach suggested by Porter in his work *Emergence of the Past: a theory of historical explanation* (1981). Porter proposes that any historical event, in this case the introduction of uniform accounts, can be investigated using six elements. The first element is at the level of the *individual.* This, for Porter, is 'biography' and provides important information on the role and aspirations of key individuals; their views, vision and behaviour, as well as their relationships with other elements, particularly groups and institutions. Porter recognises that at this level, there is the possibility of 'bias'. The next two levels are *groups* and *institutions* and although it is not always obvious whether a group is 'large enough, permanent enough, structured enough or associated closely enough with certain physical structures or symbols to be called an institution' (Porter, 1981:92), both can be analysed by probing, and exploring, relationships between other groups and other elements. In his work on the creation of the Thames Embankment Porter suggests that an:

> '...[A]nalysis of the competing groups, the meanings they attributed to the Embankment and the process through which these meanings were negotiated, stabilized, and elaborated provides a running commentary on the metamorphosis of the project.' (Porter, 1998:9)

A group can be mobilised, perhaps from existing groups and institutions, for a specific purpose, but without formalising themselves as a group. The next three elements can be regarded as the more contextual elements. The first element is labelled *concepts* and defined as 'the ideas, principles and doctrines that serve as foci for patterns of meaning that involve many other elements' (Porter, 1981:92). For Porter these concepts often motivate individuals, groups and institutions to propose change and often become associated with, particular groups or institutions. Porter's final two elements are *forces* and *universals.* Forces are 'traditionally used by historians to indicate their field of enquiry', with examples including 'economic, political, technological, religious' (Porter, 1981:94). The final level, universals, is the most abstract and Porter uses 'enlightenment' and 'romanticism' as examples and suggests that they are often described using a single word. In relation to UK hospitals, 'voluntarism' could be regarded as a universal concept embracing the period under discussion.

The paper first provides an analysis of antecedent conditions, focusing on technological and economic forces, and the concepts of managerialism and professionalism, which helped create new groups and institutions within the hospital world. The next section provides an analysis of how the 'competing groups' are mobilised to challenge, and replace existing accounting systems and is followed by a comparison of the accounting systems proposed. Analysis of the role of funding institutions, professional associations and the standardisation of accounting forms in the spread of the uniform accounts follows. The paper concludes with a summary and discussion.

Table 1
Number and type of beds in voluntary hospitals

	1861	*1891*	*1911*	*1921*
Teaching	5,291	7,228	8,284	9,548
General	6,658	15,184	21,651	27,443
Infectious Diseases	238	443	160	178
Tuberculosis	288	1,075	4,200	7,015
Maternity	139	210	311	462
Other Special	2,008	4,701	6,495	9,521
Chronic	150	679	2,120	2,347
Total	**14,772**	**29,520**	**43,221**	**56,514**

Source: Pinker, 1964:61

3. Antecedent conditions

3.1. Growth, governance and funding

A number of authors note that in the latter half of the 19th and early 20th century there was an enormous growth in the voluntary hospital movement and this is often illustrated by the substantial increase in bed numbers, as shown in Table 1 (Abel-Smith, 1964; Pinker, 1964; Cherry, 2000).

Hospital historians identify a combination of factors contributing to this growth, including: improvements in medical science; the creation of the medical profession and industrialisation (Rosen, 1979; Granshaw, 1997), which, in turn, led to a shift in the type of care. The period 1880–1920 is often characterised as one 'transforming' the role of the hospital (Abel-Smith, 1964; Maggs, 1993; Granshaw, 1997; Porter, 1999). The social historian Porter (1999:380) argues that:

> 'Many developments – notably new surgical possibilities thanks to anaesthetics and Listerism and the humanizing role of nurses – were transforming the hospital from a charitable refuge for the sick poor into an all-purpose medical institution... Teaching and research were increasingly based on hospital sites'.

He quotes an American doctor, in 1930, reflecting on 50 years of medicine, to illustrate:

> 'One of the very greatest changes that I have observed in the past fifty years has been in the attitude of the public towards hospitals. Dread of them was general and well founded before the days of antiseptic surgery. But with its widespread adoption, fear faded rapidly from the lay mind.' (Robert Morris, quoted in Porter, 1999:380)

Hospitals were numerous, but were not a homogeneous group, varying in size, funding, age and medical specialty (Abel-Smith, 1964). They were often (Stone, 1927) divided into three types: general, teaching and specialist hospitals, and while, as independent institutions, it is difficult to generalise on their governance, Stone (1927) identifies three common features: independently funded, senior medical staff unpaid and managed by a board of governors.

Hospital funding and governance was linked (Mohan and Gorsky, 2001). Subscribers who paid an agreed annual amount became hospital governors and were able to attend meetings and play a role in the management of the institution (Abel-Smith, 1964). The governors elected a *committee of management* (house committee), which met on a weekly, sometimes monthly, basis and, certainly by the late 19th century, they appointed a 'secretary' who was largely responsible for management of the hospital, although (in most cases) not directly the medical and nursing staff (Abel-Smith, 1964; Mohan and Gorsky, 2001). Another 'corporate governance' device, used by some hospitals, was the quarterly open court, open to all governors, where they could ask questions and examine hospital minutes of meetings (BPP, House of Lords, Ryan 1893, para. 14401).

In addition, many hospitals had a series of subcommittees; particularly common were finance and medical committees, which generally met each month (Abel-Smith, 1964). The role of the finance committee varied, but there was some sort of expenditure analysis and the monitoring of income sources, which was of key concern, particularly as hospital financing became more complex (BPP, House of Lords, Ryan, 1893; Cherry, 1992). Most hospitals had significant income from long-term assets and therefore the investment decision was an important one for governors. While exact managerial relationships are difficult to establish and were likely to vary between hospitals, in general, doctors appeared to have control of patient care issues, with the hospital secretary having overall managerial authority, but reporting directly to the hospital Governors (Abel-Smith, 1964:154–155).

The increased size and number of hospitals placed added pressure on their ability to fund ac-

Table 2
Source of income for hospitals – 1899

	Medical Schools		*General Hospitals*		
Percentages	*London*	*Provincial*	*London*	*Provincial*	*Total*
Annual Subscriptions	7.2	24.0	7.0	22.8	13.7
Donations	7.0	9.6	9.2	11.5	9.0
Boxes	0.2	0.3	0.5	0.3	0.3
Prince of Wales Fund (King's)	3.6	0.0	1.7	0.0	1.8
Hospital Sunday Fund	3.6	5.5	2.4	5.1	4.1
Hospital Saturday Fund	0.7	3.6	0.6	5.7	2.4
Contributions from Workplace	0.4	8.3	0.1	9.9	3.9
Invested Property	37.4	24.8	4.5	20.8	24.9
Private Nursing Institutions	0.7	1.0	0.5	1.7	1.0
Nurses and Probationers' Fees	0.7	1.2	0.1	0.9	0.7
Patient Payments	1.2	2.1	1.2	1.9	1.5
Miscellaneous Receipts	0.4	1.2	0.1	0.6	0.5
Total Ordinary Income	63.1	81.6	27.9	81.2	63.8
Donations for Special Purposes	7.8	3.4	60.1	5.5	16.6
Legacies	29.1	15.0	12.0	13.3	19.6
Total income	**100**	**100**	**100**	**100**	**100**

Source: Burdett's Hospitals and Charities, 1901

tivities, which led to new funding sources being sought (Burdett, 1881; Cherry, 1992, 2000; Berry, 1997). Table 2 gives a 'snap-shot' of hospital funding for 1899. The main source was income from investments, at close on 25% overall, but as high as 37% for London medical schools. Attracting and maintaining funds for investment was a crucial task and was linked to success in attracting legacies and other large one-off donations. Indeed, legacies and large one-off donations, accounted for 36.2% of total income, while annual subscriptions and donations were surprisingly limited at 22.7% of total income. When taken together, the percentage of total income directly donated to hospitals was 58.9.

By the 1880s we see the development of another important source of income: *hospital funding institutions* (Cherry, 1992, 2000; Waddington, 1995, 1996). There were three main funds, Sunday, Saturday and later the King's Fund, which Waddington views as a 'new departure in hospital funding – a form of indirect philanthropy' (1996:186) as they collected money on behalf of hospitals and made allocations to those hospitals they considered worthy. In addition, workplace contributions, normally deductions from workers wages, by large local employers, also played an important role in hospital funding (Cherry, 2000). There was a significant difference between London and the provinces in the extent of income from these last four sources; almost 21% of total income for general hospitals in the provinces while only 4.8% for general hospitals in London (Cherry, 2000).

3.2. Professions, efficiency, early institutions and Burdett

In addition to changes in the sources of income, the period after 1850, and particularly after 1880, saw the creation of professional organisations (Sturdy and Cooter, 1998), with the Medical Act, 1858, introducing registration, and later the creation of the General Medical Council (Gelfand, 1993). Moves towards a more professionalised nursing service followed, partly stimulated by more complex care regimes in hospitals and this was illustrated by the increasing numbers employed (Maggs, 1987). Burdett (1901) estimates that, at the London Hospital, between 1878 and 1900 the number of nurses per bed had increased from 0.25 to 0.46.

Sturdy and Cooter argue that 'efficiency became an abiding concern within the voluntary hospitals from the last third of the nineteenth century' (1998:424), and that this reflected wider changes in society, and, in particular, the development of a managerial culture (Searle, 1971; Miller and O'Leary, 1987; Perkin, 1989). Further evidence of this, for Sturdy and Cooter, was; 'the greater ordering and segregation of patients by new forms of architecture which literally restructured hospitals in the interests of efficient moral management' (1998:424), the increasing emphasis on administration and the growth of funding institutions. An increased concern with the concept of 'efficiency' and indeed, more broadly, 'management' spread to hospital medical staff and they note that doctors:

> '...[B]egan to look for ways of improving the efficiency and productivity of their practices... it had become common practice for senior hospital surgeons to marshal the junior doctors training under them into formal hierarchies, among whom they divided responsibility for different aspects of the clinical work. The term adopted for this form of organisation – 'the firm' – carried clear overtones of business management.' (Sturdy and Cooter, 1998: 425)

Another indicator of the development of more formal managerial structures was the increasing use and importance of the Hospital Secretary, who reported directly to the House Committee of Governors (Sturdy and Cooter, 1998).

One of the main performance tools used to evaluate hospital efficiency, in the latter decades of the 19th century, was the use of cost-per-bed data and this eventually led to calls for hospitals to use similar or uniform methods to calculate this key indicator (BPP: House of Lords, 1893; Rivett, 1986; Jones and Mellett, 2000). Attempts to compare hospital performance has a long history (Moore, 1999), for example, in 1857 the Statistical Society published a report highlighting the significant cost differences between, what were referred to as, 'ancient' hospitals, like Bart's, Guy's and St Thomas', compared to the 'modern' hospitals such as the Royal Free and University College (*Lancet*, 1858:634; Rivett, 1986:113). In 1863 Fleetwood Buckle's book, *Vital and Economical Statistics of the Hospitals, Infirmaries of England and Wales*, provided data on 117 hospitals including percentage mortality rates, average number of beds per medical officer, as well as the average cost-per-bed and cost-per-in-patient.

In the early 1880s a key external policy *institution* began to take an interest in the organisation and management of the voluntary hospitals: the National Association for the Promotion of Social Sciences (NAPSS) (Millman, 1974; Rivett, 1986; Moore, 1999). NAPSS, referred to as the Social Science Association (SSA), was an example of an early institution providing a 'focal point for those who sought a better way of delivering medical services through a well-organized hospital system' (Millman, 1974:122). The SSA was 'a potent political force' (Millman, 1974:123), with their influential annual conferences helping promote public policy debates and its members were 'practically oriented and deeply involved in carrying out the business of the Empire' (Millman, 1974:123).

In 1881, the SSA, set up a special committee to enquire into hospital administration and in 1883 they organised, with Burdett, a conference for hospital managers (Rivett, 1986). Millman notes that:

> 'Men like Henry C Burdett, Timothy Holmes and T Gilbart-Smith examined the organization, financing and delivery of hospital services. The result of these studies led to agitation for hospital reform in the 1880s. The Social Science Association provided a focus for this agitation by sponsoring Britain's first Hospital Administration Conference.' (1974:124)

Burdett presented a paper: *The present financial difficulties of the Metropolitan Hospitals: their cause and probable results. Hospital finance and audit* (SSA, 1883). This used data collected from 67 hospitals to illustrate the financial problems faced by hospitals, outlining a number of weaknesses in accounting practices including the paucity of information and, by implication, the manipulation of accounts:

> 'In but a few instances is a balance sheet presented at all. Frequently all that is forthcoming is a statement of the receipts and payments for the previous 12 months, but from which statement are sometimes excluded the receipts from legacies, the amount of stock sold or purchased. At another general hospital the accounts are made to show an excess of income of, say, £3000, and this excess appears year after year.' (SSA, 1883:88)

While this paper makes no reference to the need for uniform accounting, this is implied in the narrative:

> 'I therefore hope, in the interests of the hospitals, that as one result of this Conference, we may get an agreement as to the best and completest system of keeping hospital accounts, and that the best and most carefully conducted charities will decide to adopt it.' (SSA, 1883:90)

From this conference the Hospital Association, made up of hospital secretaries, was created to 'facilitate discussion of hospital management' (Millman, 1974; Rivett, 1986:126). This new group was to prove an important advocate of performance measurement, efficiency and the 'best practice' agenda. Its aim was described as '... bringing together for conference and mutual help accredited representations of the voluntary hospitals both from London and the country' (Hospital, 1893:25). Key institutional symbols, such as a weekly journal and an annual conference, were quickly established and by 1890 the Association had begun to publish books and articles on hospital administration: *Hospital extravagance and expenditure* (Michelli, 1890); *Sixteen Years of Hospital Sunday* (Waterlow, 1890); and *Contributions by patients in relation to the financial condition of the London hospitals* (Burdett-Coutts, 1890).

Sir Henry Burdett, a key promoter of the

Hospital Association, was perhaps the most influential individual in the early moves towards a more managerial, or formalised, organisational culture in hospitals, and an increasing number of authors identify his role in promoting hospital management (Millman, 1974; Rivett, 1986; Moore, 1999; Cook, 2001), the creation of the King's Fund (Prochaska, 1992) and a pension fund for nurses (Maggs, 1987). Indeed as an author on hospital management, owner and editor of hospital journals and with his high level contacts in the philanthropic world his influence permeates much of the debate in this period. He began his career in banking, at what appears to be a fairly low level, and then became hospital secretary at Queen's Hospital, Birmingham (Hospital, 8 May 1920).

At 26 Burdett started medical studies but did not take his final examinations (Rivett, 1986); instead returning to hospital administration, significantly perhaps, in London, becoming House Governor to the Seaman's Hospital, Greenwich (Prochaska, 1992). In 1881, he became Secretary to the Share and Loan Department of the Stock Exchange and in 1882 produced *Burdett's Official Intelligence*, later to become the Stock Exchange Yearbook (Morgan and Thomas, 1969). How he was able to transfer from hospital secretary to this lucrative post at the stock exchange is unknown, but certainly he appears to have had good contacts within the 'establishment', and these were to further aid his philanthropic aspirations. (Hospital, 8 May 1920)

He owned the Scientific Press and started the professional association journals, *The Hospital* and *The Nursing Mirror* together with the annual publication *Burdett's Hospital and Charities Yearbook*. Burdett used these publications to promote his views on hospital management and, more importantly, to publish hospital performance data, in particular, promoting the rate, or cost, per occupied bed as a key measure, as 'by the rate per occupied bed one judges whether or not an institution is being arranged economically' (Burdett Papers, MS ENG d.2887:50). He also appears to have had a close relationship with the Prince of Wales (Prochaska, 1992) and this, together with his City contacts, was a critical factor in the creation of the King's Fund. Indeed, Prochaska claims that 'Burdett and the Prince wielded unrivalled power in the hospital world' (1992:18).

4. Groups and institutional conflict

The previous section identified changes in the nature of hospital care and funding, concerns about efficiency and a more managerial focus within hospitals as providing the context for accounting reform. In addition, early groups and a key individual, Burdett, were identified as promoting hospital reform. While the process of change is continuous this section concentrates on the activities of specific competing *groups* and *institutions*, beginning with the entry of two external institutions, the Charity Organisation Society (COS) and the Institute of Chartered Accountants in England and Wales (ICAEW). The ensuing debate, on accounting reform is complex, with 'rival' groups and institutions using a variety of tools to promote accounting, and organisational, change.

4.1. The intervention of 'outside' institutions: COS and ICAEW

The Charity Organisation Society (COS), created in 1869, was concerned that 'ill considered and unsystematic philanthropy' (Owen, 1965:220), discouraged individual responsibility. The society was organised around local committees with the aim of 'bringing together the applicant and the voluntary agency best equipped to assist him' (Owen, 1965:222). Whelan argues the COS:

> '...[E]pitomised, from the start, the view that alms carelessly given are worse than no alms at all. It urged people to think before giving money to those requesting assistance, and it instigated a rigorous policy of enquiring into the backgrounds of applicants.' (2001:2)

COS efforts to control, and monitor, both charitable institutions and those seeking assistance from them, led to demands for changes in their organisation and, with this, improved accounting information. This applied particularly to the largest and most numerous of the charities: voluntary hospitals (Bosanquet, 1973). The major reason for the interest of COS in hospitals was what was described at the time, as the 'abuse' of hospital outpatient departments (Abel-Smith, 1964). These departments caused much controversy between 1880 and 1911, and their role, within the healthcare environment, was challenged from two perspectives. Patients seen by a hospital doctor, at out-patient departments, had free treatment, and many GPs believed this reduced their income from patient fees. Charity reformers, particularly COS, believed this discouraged prospective patients from providing for themselves (Abel-Smith, 1964; Rivett, 1986). This out-patient issue drew COS into other hospital debates, for example, they demanded that some sort of central hospital regulator be set up for London. Bosanquet states that:

> 'The aim of the Society was neither to make any investigation itself, nor to take part in the actual management of the hospitals; but merely to facilitate the institution of a central Board of Management, representative of the hospitals themselves, and working out a definite system of medical relief.' (1973:215)

COS established an internal committee to examine healthcare organisation and began a campaign for an enquiry into the operation of voluntary hospitals in London and, largely due to their efforts, an enquiry was set up by the House of Lords in 1890 (Bosanquet, 1973; Rivett, 1986). Their evidence, to the House of Lords, suggested that hospitals manipulated their accounts as a fund-raising device. For example Montefiore, Organising Secretary of the Medical Committee of the COS, stated that:

> 'The most general effect that seems to be striven for is to manufacture a deficiency where there is not one. The object of this is to make the accounts look as if the charity were in debt, and this is done in order that a piteous, but lying, appeal may be made to a sympathising but critical public. This is the reason we frequently find so many accounts in one report.' (BPP, 1893, Montefiore's evidence, para.171)

Their disquiet about hospital accounting, and, indeed, the accounts of all charitable institutions, led to COS setting up an alliance with the ICAEW. An editorial in *The Accountant* suggests that the two organisations agreed on more than just accounting reform, with their views on charity and charitable organisations being remarkably similar:

> 'The Charity Organisation Society has from time to time endured a great deal of unmerited obloquy, but it has managed to outlive its principal detractors. In our opinion this institution is founded upon the truest principles of practical benevolence as opposed to indiscriminate and ill-bestowed almsgiving, which generally aggravates the very evils it is intended to ameliorate.' (*The Accountant*, 1890:207)

The Accountant published three articles on the accounts of charities in September, 1888. Why the journal chose to discuss *charitable accounting* at this time is not revealed, nor is the author identified. Three months later Gerard Van De Linde delivered a paper to the COS Council, *The Preparation and Audit of the Accounts of Income and Expenditure Relating to Charitable Institutions* (Van De Linde, 1888), which outlined pro-forma statements of accounts for hospitals and led to the formation of a committee, with membership including E. Cooper (Cooper Brothers and Co.) and G.W. Knox (Knox, Burbridge, Cropper and Co.), to 'report on the best form of accounts for charitable institutions of different types' (*The Accountant*, March 1890:161).

4.2. Internal group resistance and House of Lords intervention

COS and the ICAEW immediately came into conflict with hospital managers and Burdett's journal *The Hospital*. For example, when the (COS/ICAEW) Report was presented to a London meeting of COS a number of hospital managers appeared less than impressed. Michelli, Secretary at the Seaman's Hospital, stated that '... many of the recommendations were made from the actuarial or auditor's point of view'. In addition he questioned the usefulness of the accounts to the hospital secretary and argued that the form of accounts 'was not new' (*Charity Organisation Review*, 1890:173). Ryan, Secretary at St Mary's Hospital, was even more critical, stating:

> 'The report from the point of view of general hospitals was purely and absolutely superfluous. The report recommended what had long ago been done by the general hospitals. The difficulty of uniformity of accounts was very much a question of uniformity in detail, not in style or principle; and these difficulties of detail were not practically dealt with in the form of accounts in the report.' (*Charity Organisation Review*, 1890:173)

Burdett used his editorship of the journal *The Hospital* to make a further attack on COS and specifically on outside intervention:

> 'The report of the COS on hospital accounts is remarkable in more ways than one. It proves to demonstrate that gentlemen who have no technical knowledge of the special requirements of particular fields of work should refrain from expressing opinions thereon, and specially from formulating definite proposals and forms which reveal an ignorance of technique as amusing as it is instructive.' (*Hospital*, 1890:405)

This evidence suggests that leading figures within the hospital movement had great difficulty in accepting incursions by COS and the ICAEW, but these exogenous institutions did succeed in raising the profile of hospital accounting and management and, in 1890, were successful in their attempts to establish some form of government investigation, with a committee of the House of Lords beginning a 'hospital enquiry' in 1890.

The idea of some sort of government investigation was not new (Moore, 1999) and COS were assisted in their campaign for an enquiry by the medical profession in the form of a petition and assistance from the professional press (*Charity Organisation Review*, 1890; Bosanquet, 1973, Rivett, 1986). Bosanquet states that:

> 'This petition was backed by an extraordinary support from the medical profession. It was signed by about 1,000 members, drawn from all grades and sections of the profession, and was supported also by *The Lancet* and other medical papers.' (Bosanquet, 1973:21)

Again there was resistance from Burdett and the internal hospital institutions. For example, in an editorial, in his journal *The Hospital*, with the title, 'A Hospital Inquisition', he rejects the need for a hospital enquiry and takes the opportunity to attack COS and its intervention:

> 'We cannot afford to allow these splendid institutions, built up by the efforts and sacrifices of a noble philanthropy, to be despoiled or discredited at the bidding of an irresponsible society with a craze for meddling ...' (1890:42)

Continuing:

> 'There is no doubt whatever that in sympathy with hospitals and in practical acquaintance with everything that appertains to their management, the Hospital Association is as superior to the Charity Organisation Society as the latter body is to a second-rate detective in ferreting out the delinquencies of a begging letter impostor.' (1890:43)

The House of Lords committee, set up in 1890, collected extensive evidence from hospital practitioners on the operation and management of voluntary hospitals in London and this data collection process appears to have been the catalyst for accounting change (BPP, 1890–93; Rivett, 1986). The enquiry was wide ranging and considered the effect of free out-patient provision, the possibility of introducing some sort of monitoring organisation or central board to license or approve new hospitals, as well as accounting and audit arrangements. Though limited to London hospitals, it provides a detailed record of hospital organisation and management from leading and influential figures within the hospital movement, and there was almost unanimous agreement that a uniform system of accounts should be introduced. For example, the final report states:

> 'Under the existing arrangements, each hospital making out its own financial statement after its own fashion, it is found impossible to form anything approaching a trustworthy estimate of the comparative cost of management and maintenance as between different hospitals. The estimated annual cost of a bed, which is the ordinary standard of comparison, is calculated after so many different methods, producing such widely different results, as to be altogether fallacious.' (BPP, 1893, Final Report, para.242)

This emphasis on the need for cost-per-bed comparisons was central to the demand for uniform accounting, and it was argued that, only after such reform could this 'assist hospitals themselves in checking their own extravagance, and the subscribers in judging how the money was spent' (BPP, 1893, Final Report, para.242). The Lords' report also drew attention to difficulties associated with cost-per-bed comparisons, such as, isolating and adjusting for the cost of out-patients treated in the hospital. Although they appeared to be wary of recommending an accounting system that could be interpreted as a challenge to the concept of voluntarism, stating:

> 'Objection was taken to any attempt being made to forcing all the hospitals into an exact method; this, it was thought, savoured too much of State control, and would tend to destroy individuality.' (BPP, 1893: para.251)

The Lords' Enquiry took three years to complete their Report. This time lag and their obvious reluctance to intervene appeared to allow hospital individuals and groups the opportunity to step into the void and take control of the accounting change agenda. In particular, the London Sunday Fund emerged as powerful institution that used their economic power, and the high social status of the individuals within it, to drive accounting change in London hospitals (Rivett, 1986; Waddington, 1995).

The Sunday Fund was closely associated with the Church where collections on a specific Sunday [Hospital Sunday] were used for the benefit of local voluntary hospitals (Waddington, 1995). Waddington states:

> 'It was envisaged that a fund would remove abuse and encourage reform, as distribution was to be placed in the hands of a scrutinising committee which would identify any problems and penalise hospitals accordingly. Hospitals, it was hoped, would reform, if only to improve the size of their awards.' (1995:153)

The Fund was run '...on strict commercial grounds as the committee was made up from London's leading financiers, businessmen, politicians and philanthropists' (Waddington, 1995:154). It required hospitals to submit cost and patient activity information before the Fund would award grants and it produced a table of performance statistics for each hospital.

In December 1890 a special meeting of the Distribution Committee (Burdett, 1916) was convened to 'consider the possibility of assigning some uniform system of accounts to be presented to their subscribers' (Metropolitan Sunday Fund, MS 30587/5). This meeting of hospital managers, in 1891, recommended a format (or layout) of accounts, consisting of an income and expenditure account similar to, but not exactly the same as, the one Burdett had presented to the Lords' enquiry. Subsequently a detailed index of classification of expenditure was agreed after which the council of the Sunday Fund sent out a recommended 'form of accounts' to all hospitals requesting grants (Burdett, 1916). These accounts were published in

1893 as 'Burdett's' *Uniform system of accounts for hospitals, charities, missions, and public institutions* (1893).

The speed with which the Sunday Fund produced the uniform accounts suggests that the internal institutions wanted to retain control of the administrative apparatus of the hospitals and were not prepared to surrender accounting policy to external agencies like the COS and ICAEW. However, the extent to which uniform accounts can be attributed to Burdett, as has been subsequently claimed, is unclear. Burdett states that the system 'originated at the Queen's Hospital, Birmingham, nearly half a century ago (1869) and was devised by Mr. (now Sir) Henry C. Burdett, with the co-operation of an eminent Birmingham accountant, the late Mr. William Laundy' (1916:1). Burdett was Secretary at Queen's Hospital for over five years but unfortunately the hospital's archive (at Birmingham Library) is limited, while Burdett's papers, at the Bodleian Library, also provide little further information on the uniform accounts; Burdett's assertions cannot therefore be confirmed.

Although, between 1881 and 1893, Burdett delivered a number of papers on hospital management and accounting he made no reference to the uniform system of accounts, supposedly devised for the Queen's Hospital in 1869. For example, his papers; *Hospitals and the State* (Burdett, 1881) and *the present financial difficulties of the Metropolitan Hospitals: their cause and probable results. Hospital finance and audit* (SSA, 1883) while discussing accounting and audit, make no reference to the Birmingham system and neither did his evidence to the House of Lords enquiry (BPP, 1893). Also, Burdett's uniform accounts were very similar to those already in use, and Berry notes that in the 18th and early 19th century, 'items were classified on similar lines to the classifications in the income and expenditure accounts proposed by Henry Burdett in 1893' (1997:8).

It could be that Burdett did take, or indeed amend the accounts, in existence at Birmingham in 1869 and use these as the basis for the 1893 accounts, particularly as Burdett's Income and Expenditure account (created in 1893) was, as Berry (1997) states, similar to that already in wider use. The distinguishing feature of Burdett's accounts, the *'index of classification'*, was, according to Burdett's own account, created by Michelli (Burdett, 1916).

What is clear is that the uniform accounts were formalised in the early 1890s, at the instigation of the Sunday Fund with the help of Burdett, and a number of London-based hospital managers. Burdett's position, as owner of The Scientific Press, allowed rapid publication of the proposed uniform accounts and his reputation helped legitimise the accounts within the voluntary hospital sector. A 'hospital' institution, the Sunday Fund, was able to pre-empt the findings of the House of Lords committee and exclude the external institutions, COS and ICAEW, from hospital financial reporting, by producing their 'own' accounts, using Burdett's name in 1893. Although COS/ICAEW played an important campaigning role in promoting accounting reform they were unable to usurp the institutions of the hospital world in the design, and later, the implementation of uniform accounting.

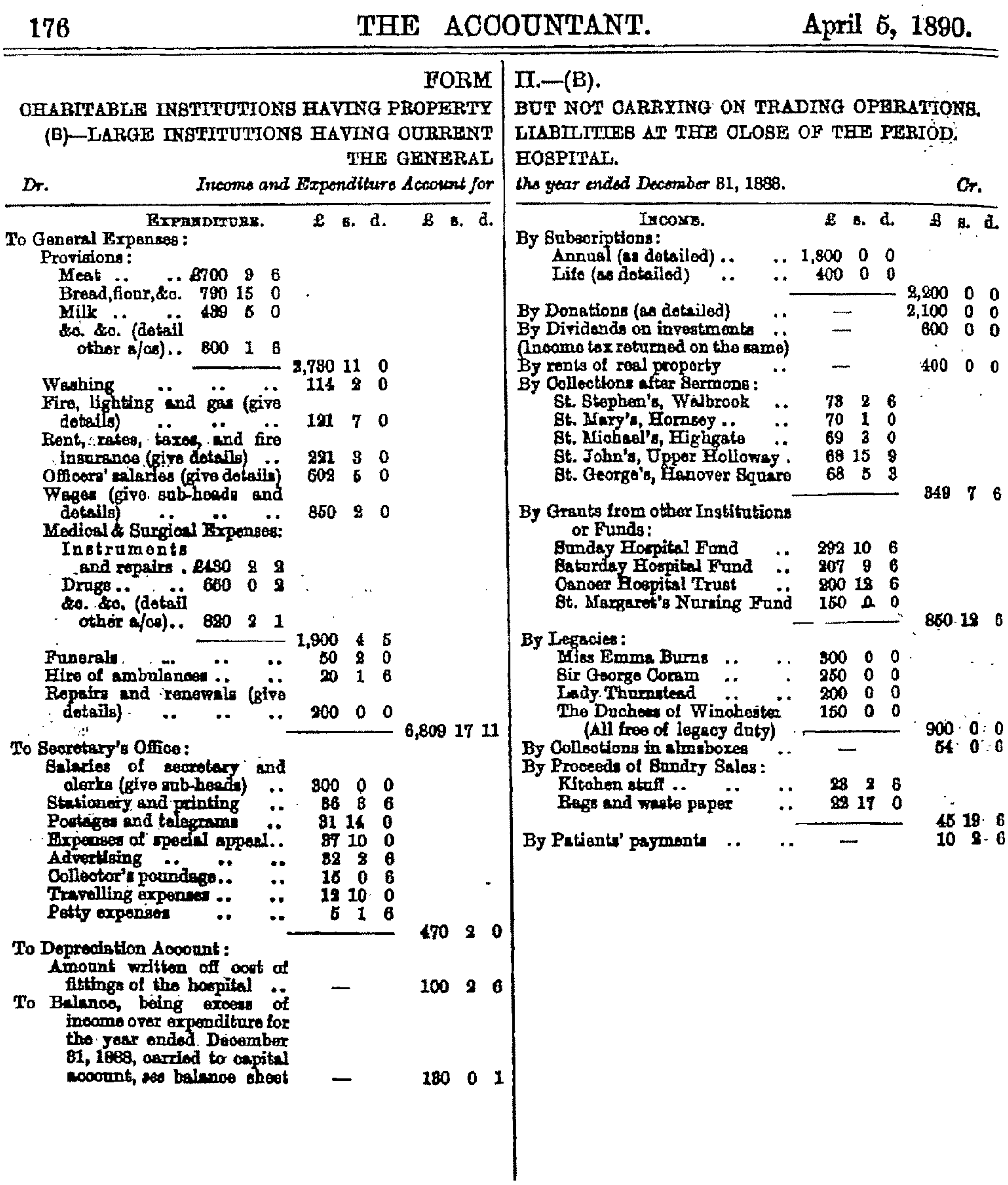
5. Comparison of the various proposed accounts

The preceding sections set out the conditions that led to the creation, and eventual standardisation, of hospital accounting in the 1890s. Broad social changes encouraged managerialism and professionalism, while increased funding, from a variety of sources, meant wider interest in the public accountability of hospitals. Campaigning bodies, such as COS, had an ideological agenda and this appeared to gel with that of the accounting professional association, the ICAEW, but both of these institutions clashed with the vested interest of the hospital managers. Although the need for uniformity was supported by all groups and institutions it was not clear which of the various proposals would actually be adopted and this section provides an overview of the alternatives on offer.

At a narrow technical level one can compare the proposals according to their merits in dealing with various categories of revenue and expense, and with assets and liabilities, through their presentation in receipt/payment, income/expense and balance sheet statements. However, this would be to misunderstand what was at stake. The newly founded Hospital Association wanted control of a key element of the reporting and control structure and hardly wished to concede that an external professional body, such as the ICAEW, could lay down better processes and procedures than hospital professionals with extensive experience. Thus the battle, though ostensibly over narrowly technical issues, actually had much wider consequences and the following sections need to be read with this in mind.

There was general agreement on the need for uniformity and on the accounting treatment of most items of income and expenditure and these were no longer issues for debate. However the internal and external groups and institutions differed fundamentally about the objectives of the uniform accounts. COS/ICAEW emphasised the production of accounting information for external accountability whereas internal institutions were far more concerned with detailed comparative costing data for management purposes. The four main

Figure 1
Income and Expenditure Account recommended by the COS/ICAEW



176 THE ACCOUNTANT. April 5, 1890.

FORM II.—(B).

CHARITABLE INSTITUTIONS HAVING PROPERTY BUT NOT CARRYING ON TRADING OPERATIONS.
(B)—LARGE INSTITUTIONS HAVING CURRENT LIABILITIES AT THE CLOSE OF THE PERIOD.
THE GENERAL HOSPITAL.

Dr. *Income and Expenditure Account for the year ended December* 31, 1888. *Cr.*

EXPENDITURE.		£ s. d.	£ s. d.
To General Expenses:			
Provisions:			
Meat	£700 9 6		
Bread, flour, &c.	790 15 0		
Milk	489 5 0		
&c. &c. (detail other a/cs)..	800 1 6		
		2,780 11 0	
Washing		114 2 0	
Fire, lighting and gas (give details)		121 7 0	
Rent, rates, taxes, and fire insurance (give details) ..		221 3 0	
Officers' salaries (give details)		602 5 0	
Wages (give sub-heads and details)		850 2 0	
Medical & Surgical Expenses:			
Instruments and repairs .	£430 2 2		
Drugs	650 0 2		
&c. &c. (detail other a/cs)..	820 2 1		
		1,900 4 5	
Funerals		50 2 0	
Hire of ambulances		20 1 6	
Repairs and renewals (give details)		200 0 0	
			6,809 17 11
To Secretary's Office:			
Salaries of secretary and clerks (give sub-heads) ..		300 0 0	
Stationery and printing ..		86 8 6	
Postages and telegrams ..		31 14 0	
Expenses of special appeal..		37 10 0	
Advertising		32 2 6	
Collector's poundage.. ..		15 0 6	
Travelling expenses		12 10 0	
Petty expenses		5 1 6	
			470 2 0
To Depreciation Account:			
Amount written off cost of fittings of the hospital ..		—	100 2 6
To Balance, being excess of income over expenditure for the year ended December 31, 1888, carried to capital account, see balance sheet		—	180 0 1

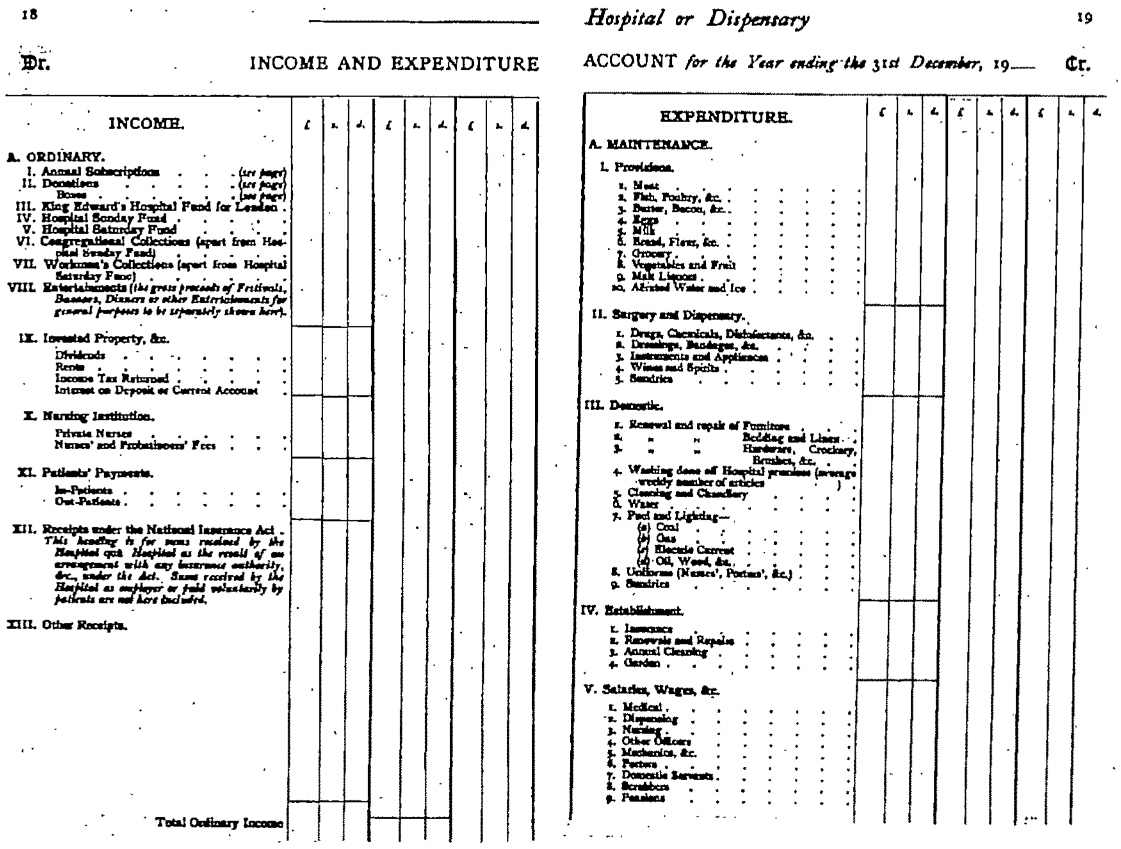
INCOME.	£ s. d.	£ s. d.
By Subscriptions:		
Annual (as detailed)	1,800 0 0	
Life (as detailed)	400 0 0	
		2,200 0 0
By Donations (as detailed) ..	—	2,100 0 0
By Dividends on investments .. (Income tax returned on the same)	—	600 0 0
By rents of real property ..	—	400 0 0
By Collections after Sermons:		
St. Stephen's, Walbrook ..	73 2 6	
St. Mary's, Hornsey	70 1 0	
St. Michael's, Highgate ..	69 3 0	
St. John's, Upper Holloway .	68 15 9	
St. George's, Hanover Square	68 5 3	
		349 7 6
By Grants from other Institutions or Funds:		
Sunday Hospital Fund ..	292 10 6	
Saturday Hospital Fund ..	207 9 6	
Cancer Hospital Trust ..	200 12 6	
St. Margaret's Nursing Fund	150 0 0	
		850 12 6
By Legacies:		
Miss Emma Burns	300 0 0	
Sir George Coram .. .	250 0 0	
Lady Thurnstead	200 0 0	
The Duchess of Winchester	150 0 0	
(All free of legacy duty)		900 0 0
By Collections in almsboxes ..	—	54 0 6
By Proceeds of Sundry Sales:		
Kitchen stuff	23 2 6	
Rags and waste paper ..	22 17 0	
		45 19 6
By Patients' payments	—	10 2 6

schemes for charitable/hospital accounting reform, proposed by the main groups and institutions, are analysed in the next section.

5.1. ICAEW (1888), Van de Linde (1888) and COS/ICAEW (1890)

The Accountant ran a series of articles on charitable accounting in September 1888, and though they refer to charitable institutions in general, the examples used are all from hospitals. The articles begin with a description of how 'straightforward' accounting for a charity is and recommend an income and expenditure account with two separate statements, one for provision costs and another for dispensary and surgery expenses. A balance sheet, which included land, buildings and equipment, was also recommended, but without depreciation, stating 'it is not usual to charge depreciation in these accounts; this matter is not of such importance here as with commercial concerns' (*The Accountant*, 1888:615). All legacies and donations over £50 were taken straight to the balance sheet

Figure 2
Income and Expenditure Account – the Uniform System of Accounts



18 ______ *Hospital or Dispensary* 19

Dr. INCOME AND EXPENDITURE ACCOUNT *for the Year ending the 31st December, 19*___ Cr.

INCOME. £ s. d. £ s. d. £ s. d.

A. ORDINARY.
I. Annual Subscriptions . . . (*see page*)
II. Donations . . . . . (*see page*)
Boxes . . . . . . (*see page*)
III. King Edward's Hospital Fund for London .
IV. Hospital Sunday Fund . . . . .
V. Hospital Saturday Fund . . . . .
VI. Congregational Collections (apart from Hospital Sunday Fund) . . . . .
VII. Workmen's Collections (apart from Hospital Saturday Fund) . . . . .
VIII. Entertainments (*the gross proceeds of Festivals, Bazaars, Dinners or other Entertainments for general purposes to be separately shown here*).

IX. Invested Property, &c.
Dividends . . . .
Rents . . . .
Income Tax Returned . . . . .
Interest on Deposit or Current Account .

X. Nursing Institution.
Private Nurses . . . . . .
Nurses' and Probationers' Fees . . .

XI. Patients' Payments.
In-Patients . . . .
Out-Patients . . . .

XII. Receipts under the National Insurance Act .
This heading is for sums received by the Hospital qua Hospital as the result of an arrangement with any Insurance authority, &c., under the Act. Sums received by the Hospital as employer or paid voluntarily by patients are not here included.

XIII. Other Receipts.

Total Ordinary Income

EXPENDITURE. £ s. d. £ s. d. £ s. d.

A. MAINTENANCE.

I. Provisions.
1. Meat . . . .
2. Fish, Poultry, &c. . . . . .
3. Butter, Bacon, &c. . . . . .
4. Eggs . . . .
5. Milk . . . .
6. Bread, Flour, &c. . . . . .
7. Grocery . . . .
8. Vegetables and Fruit . . . . .
9. Malt Liquors . . . . . .
10. Aërated Water and Ice . . . . .

II. Surgery and Dispensary.
1. Drugs, Chemicals, Disinfectants, &c. . .
2. Dressings, Bandages, &c. . . . .
3. Instruments and Appliances . . . .
4. Wines and Spirits . . . . .
5. Sundries . . . .

III. Domestic.
1. Renewal and repair of Furniture . . .
2. " " Bedding and Linen . .
3. " " Hardware, Crockery, Brushes, &c. . .
4. Washing done off Hospital premises (average weekly number of articles)
5. Cleaning and Chandlery . . . .
6. Water . . . .
7. Fuel and Lighting—
(a) Coal . . . .
(b) Gas . . . .
(c) Electric Current . . . . .
(d) Oil, Wood, &c. . . . . .
8. Uniforms (Nurses', Porters', &c.) . .
9. Sundries . . . .

IV. Establishment.
1. Insurance . . . .
2. Renewals and Repairs . . . . .
3. Annual Cleaning . . . . .
4. Garden . . . .

V. Salaries, Wages, &c.
1. Medical . . . .
2. Dispensing . . . .
3. Nursing . . . .
4. Other Officers . . . . . .
5. Mechanics, &c. . . . . . .
6. Porters . . . .
7. Domestic Servants . . . . .
8. Scrubbers . . . .
9. Pensions . . . .

rather through the income and expenditure account.

In 1888 Van de Linde presented a paper to the COS on charity accounts. These were similar to those suggested in *The Accountant* with major differences being the treatment of legacies and depreciation. Van de Linde recommended that all legacies be taken to the income and expenditure account, and that hospital fittings be depreciated.

Shortly after this paper the COS commissioned the ICAEW to produce a report for the COS on charity accounts, which recommended that charitable institutions should produce different types of accounting information depending on the 'extent of their operations' (*The Accountant*, March, 1890:161). This ranged from a simple receipts and payments account to a trading, and income and expenditure, account, and a balance sheet for larger charities with investments. The report implies that most general hospitals would be required to complete an income and expenditure account and a balance sheet. Figure 1 shows their suggested income and expenditure account.

5.2. Burdett's uniform system of accounts – 1893

This system proposed that hospitals should publish four main statements: an *income and expenditure* account, *a balance sheet*, an *invested property* account and a *special appeal* account. The income and expenditure account (in the 1893 [1st] edition) was effectively a receipts and payments account, with 'income' and 'receipt' being used interchangeably within the text. There was no attempt to recognise changes in stock or to depreciate assets, although a distinction was drawn between revenue and capital expenditure. The *income and expenditure* account provided a detailed breakdown of sources of income and a classification of expenditure by similar subject, or type, as shown in Figure 2.

Even though Burdett suggests that the hospitals may consider an *invested property* account, listing the securities held and their income, he provides no pro-forma statement of such an account. Nor is there a *balance sheet*, and, instead, he states '… this may be prepared under the direction of the auditors in such a form as may seem to lend itself best to the circumstances of each institution' (Burdett, 1893). This appears to accord with

Table 3
Expenditure on provisions, salaries and wages

	1891	*1921*	*1938*	*1958*
	Percentage of total cost			
Provisions (food and drink)	31.3	21.6	16.2	8.4
Salaries and Wages	25.7	32.8	38.1	64.7

1891, 1921, and 1938 (Pinker, 1964:157)
1958 (Hospital Service Finance, 1959:19)

Table 4
Accounting treatment recommended by accounting reformers

Year Published	*ICAEW* *1888*	*Van De Linde* *1888*	*COS/ICAEW* *1890*	*Burdett* *1893*
Income and Expenditure Account	√	√	√	Q(More like a Receipts and Payments Account)
Balance Sheet	√	√	√ (Depending on size)	Q (recommended but not included)
Depreciation	X	√ (Fittings only)	√ (Fittings only)	X
Legacies in:				
a. Income and Expenditure Account		√	√	√ (Extraordinary Income)
b. Balance Sheet	√			

Table 5
Hospitals adopting the uniform system of accounts

Year	*1899*	*1903*	*1907*	*1912*
Number of hospitals	152	163	166	165
London Hospitals	50 from 50	59 from 59	60 from 61	61 from 61
Percentage	100%	100%	98%	100%
Provincial Hospitals				
Percentage	14 from 102 13.7%	30 from 104 28.8%	66 from 105 62.8%	88 from 104 84.6%

Source: Burdett's Hospitals and Charities (1901, 1905, 1909, 1915)

Burdett's views given to the House of Lords enquiry where he states: 'as to balance sheets and other forms in connection with the accounts of hospitals, I myself, do not attach much importance to them per se' and adds that 'what we really want to get is some simple system which staff include the same things under the same heads, and give the details of income and expenditure on the same lines' (BPP, 1893, Burdett's evidence para. 25880).

Therefore the accounts also included a recommended classification of expenditure index. This was a 25-page list of expenditure items, ranging from bacon and ham to surgical boots, put together by Burdett's close ally Michelli, secretary at the Seaman's Hospital (Burdett, 1916).

5.3. Homogeneity and contention

These efforts to introduce uniformity in the accounting arrangements of charitable institutions, and, with it, the voluntary hospitals, raise interesting differences in the treatment of key items of income and expenditure and in the presentation of accounting information. All the accounts appear to be obsessed with identifying the cost of provisions [food and drink] which is not surprising given the greater relative importance of these costs in the

1890s, as shown in Table 3.

In 1891 almost a third of total cost related to provisions and all the income and expenditure accounts give a detailed list of provision items. For example, Van de Linde's statements had 16 headings (1888), while Burdett had 10 headings and the ICAEW Report (*The Accountant*, 1888) recommended the completion of a separate statement for provision costs.

A summary of the controversial issues is given in Table 4. A number of accounting reformers (e.g. Burdett (1883) and Montefiore of COS (BPP, 1893, House of Lords)) identified the treatment of legacies as open to manipulation and after 1888 a consensus view developed around their accounting treatment. *The Accountant* article of 1888 recommends that amounts of £50 and above should be capitalised, while the other reports suggest that all income, including legacies, should be credited to the income and expenditure account.

Burdett's 1893 cash-based uniform accounts did not include a balance sheet while Van de Linde and the COS/ICAEW Reports both recommend a balance sheet and the depreciation of fittings. No reference is made to depreciation in Burdett's uniform accounts, which was not recognised in UK hospital accounts until the introduction of the 'internal market' in 1989 (Mellett, 1992).

The differences between Burdett's accounts and those proposed by the ICAEW could reflect a lack of accounting knowledge by Burdett and the hospital managers. A more generous interpretation would be that Burdett, and the hospital managers, were more concerned about creating appropriate comparative cost information, and Michelli's and Burdett's comments on COS accounts, previously mentioned, support this view. For example, the classification of expenditure index provided detailed information as to which sub-heading, within the income and expenditure account, each item should be charged. In addition statistical tables provided data on the number of available beds, number of days each in-patient was resident and similar out-patient information. Burdett, and the funding institutions, sought to use the information for expenditure analysis, combining it with statistical data to produce performance measurement information, such as average cost-per-occupied bed, both in total, and under subject headings.

6. The spread of the uniform system of accounts after 1893

After their success in the creation of the uniform accounts, the internal groups and institutions were still faced with the difficult task of convincing a diverse group of independent voluntary hospitals to introduce the new system. Table 5 suggests that by 1912, 90% of the larger voluntary hospitals in the UK had introduced Burdett's uniform system. They were quickly adopted in London (100% by 1899) with a somewhat slower process in the 'provinces'. *Burdett's Annual* does not include smaller cottage hospitals and the data is from Burdett's own publication and may therefore be biased, but, even so, progress towards uniformity is striking. This section explores possible reasons.

6.1. Institutions: inspections, statistics and almoners

Prochaska (1992), and Jones and Mellett (2000) suggest that the funding institutions [Saturday Fund, Sunday Fund and King's Fund] used their economic power to drive accounting change. For example, by 1896, the rules of the London Sunday Fund stated that:

> '...[T]hose hospitals and dispensaries only, which are managed by a committee duly constituted, and which produce their printed reports with Balance Sheets duly audited for three years, by a Public Accountant, and in accordance with the uniform system of accounts agreed upon, shall be allowed to participate in the Fund.' (Metropolitan Hospital Sunday Fund, MS 30586/3, 1896)

A governing 'Council' ran the Fund and monies were allocated to hospitals on the recommendations of a distribution committee (Waddington, 1995). This committee, according to a description given at the time, calculated their award in two stages, first what they regarded as the 'needs of the hospital' and this

> '... is raised or lowered at the discretion of the committee, as soon as they have determined the merits of a particular institution. The task of arriving at the merits is no doubt more difficult than determining the financial needs and rests to a greater extent on the discretion of the committee. Detailed information, including the number of beds, the average number occupied daily ... the average cost of each in-patient per week...is all laid before the committee.' (*The Hospital*, 1897:105)

In addition to this analysis, hospital secretaries were often expected to attend special meetings, called 'deputations', where there were asked questions on matters considered to be of an 'unsatisfactory character'. A number of these deputations required hospitals to complete Burdett's uniform accounts as a condition for receiving a grant (Metropolitan Hospital Sunday Fund, MS 30586/3, 1896).

Outside London, the Hospital Saturday Fund was of greater importance and was an early attempt to attract funds from 'working class' donors often from public collections or from more regular contributions deducted from wages (Abel-Smith, 1964; Cherry, 1997, 2000). The Saturday Funds appeared to have been governed by a committee of men drawn from the workplace and by the 1890s they became increasingly interested in hospital management, for example, awarding marks, out of 15, for their assessment of hospital 'efficiency' (*The Hospital*, 6 November 1897). This assessment made less use of performance measurement information than the Sunday Fund, relying instead on answers to a series of questions. These questions were more qualitative in approach, than the Sunday Fund, and perhaps reflected their interest in gaining access to hospital care for its members and more control over hospital governance rather than using accounting numbers to assess hospital performance (*The Hospital*, 6 November 1897).

In 1897 another significant hospital funding charity was created: the King's Fund. This began life as 'the Prince of Wales's Hospital Fund for London to Commemorate the Sixtieth Year of the Queen's Reign' (Prochaska, 1992), later becoming the King's Fund. In 1898 the Fund set up a system of hospital visits or inspections, of both medical and managerial practices. The medical visitors 'were a closely-knit group at the top of their profession' and the lay visitors were 'leading businessmen and philanthropic aristocrats' (Prochaska, 1992: 60). Prochaska states that:

> 'The earliest of the Fund's visiting forms asked specifically about a hospital's records and accounts, the fabric of the building, the condition of the wards...'

And

> '...though it recognised that hospitals of different types used their beds in different ways, the cost-per-bed-occupied became a major test of hospital efficiency to the fund.' (1992:62)

Hospitals requesting funding were required, as for the Sunday Fund, to produce accounts and statistical information and this was used to produce an Annual Statistical Report, starting in 1903 (Prochaska, 1992), eventually made publicly available, which can be regarded as an early attempt to use accounting information to make hospital performance 'visible' (Jones and Mellett, 2000). In addition, Prochaska suggests that 'the Fund sought to create a new generation of capable, well-paid professionals who would revamp hospital management' (1992:70) and that this was part of a wider universal trend in the period.

The other main institution, the Charity Organisation Society (COS), promoting accounting change, before the 'creation' of Burdett's uniform accounts in 1893, appeared far less interested in its implementation. Immediately after 1893 there is little reference to the accounts in 'the official organ of the Charity Organisation Society', the *Charity Organisation Review*. One possible reason was the introduction of hospital almoners. At some hospitals, particularly in London, a process of 'enquiry' into the background of patients, and their ability to pay for treatment, began to take place and this resulted in the creation of hospital almoners, the first in 1894, charged with the task of this enquiry (Bosanquet, 1973). These staff were often trained, and partly paid for, by COS (Bosanquet, 1973) and this development may have moderated criticism of hospitals by COS. In addition COS was not primarily concerned with hospital organisation and was relatively ill-equipped to challenge the hospital association in their attempts to reform managerial and accounting practice in the voluntary hospitals.

6.2. The Hospital Association: professional forces and standardisation of records

In addition to the funding institutions, another key group promoting accounting conformity was the Hospital Association. Membership was largely made up of hospital secretaries, and used two key publications to promote professional 'good practice' to their members, *The Hospital* and *Burdett's Hospitals and Charities: The Year Book of Philanthropy and Hospital Annual*. *The Hospital*, published fortnightly, described itself as 'a journal of the medical sciences and hospital administration'. It dealt with a wide range of topics including medical treatments, hospital administration and nursing issues. Importantly for the spread of the uniform accounts, they also ran a regular feature called 'Institutional Workshop', which was a summary of an inspection/visit made by a reporter, often Burdett, to a hospital. A personal visit by the powerful Burdett, with the prospect of a report on the management of the hospital in his journal, is likely to have strongly influenced how these key hospital secretaries undertook their activities, and no doubt this fact was used to promote the uniform accounts. *The Hospital Annual* or *Yearbook* was also significant in promoting the uniform accounts and the concept of managerialism. Information was supplied by a large number of hospitals throughout the world, arranged by country and type of hospital, for example, medical schools, general, children or special hospitals, with tables supplying the average cost-per-bed for each hospital.

This promotion of 'professional good practice', and more specifically the uniform system of accounts, by the Hospital Association may have been aided by the early use of *pro-forma* accounting documents. Craig identifies the period 1890–1940 as one of 'standardisation' and 'unprecedented growth in the extent of the records kept' (1991:383) and confirms that:

> 'After about 1880, printed forms produced by

> commercial suppliers were widely used by hospitals to achieve regularity and uniformity in the recording and presentation of information. Hospital registers, financial ledgers, personnel files, and clinical files were particularly affected.' (1991:384)

The entrepreneurial Burdett, who owned the Scientific Press, appears to have been quick to exploit the demand for printed forms. He 'designed in accordance with the uniform system of accounts' what he describes 'as a complete set of account books' (Burdett, 1916:4), a 350-page analysis journal, a 300-page cash book and various other printed registers. Few hospital secretaries would have had a background in accounting and are likely, therefore, to have welcomed account books, or what could be regarded as early 'accounting packages', specifically relating to hospitals, which may have been crucial to the spread of the accounts.

6.3. Spread beyond the UK

There is also evidence to suggest that the UK uniform accounts and the creation of professional managers was closely followed by similar reforms in US hospitals. Certainly the search for uniformity in hospital accounts and, with it, the increased interest in 'efficiency' measures, was apparent in the US (Allen, 1906; 1907) and the time lag between the US hospitals and the UK suggests their moves towards accounting uniformity followed the UK. Allen argues that in the US 'hospital reports lacked uniformity and clearness as to receipts and payments' (1906:299) and as a result, in 1905, a committee of:

> 'Hospital officers, contributors, finance experts, worked for fifteen months; studied the hospital experience of American and European cities... recommended unanimously but one remedy for deficits, extravagance, obsolete methods, or lack of public interest – **more light**.
>
> Many managers looked askance at the proposed remedy – viz. uniform, up-to-date system of accounts and reports.' (Allen, 1906:300)

In 1906 some hospitals in New York agreed a common 'form of recording and publishing important facts as to efficiency and needs' (Allen, 1906:307). While the proposed accounts were different, to those required under Burdett's system, the influence of the UK is also evident from the proposed creation of a US Hospital Annual. The National Association of Hospital Superintendents (Secretaries in the UK) advocated the production of 'an annual digest of hospital data such as that which has helped the British hospitals so much during the past ten years' (Allen, 1906:311), indeed Allen refers to this as an 'American Burdett'.

Another similarity and possible managerial transfer from the UK to the US was the concept of a professional association for managers. In the UK, the Hospital Association was created in 1884 and Burdett stated [six years later] the objectives of the Association were:

> '... to raise the standard of efficiency of the administration of hospitals and kindred charities ... and the means; the promotion of co-operation among those connected with and interested in these institutions. The provision of facilities for the consideration and discussion of matters connected with hospital management and the furtherance of the decisions arrived at.' (Burdett, 1890: 35)

Vogel's history of the American Hospital Association suggests this was created in 1899 and at their meetings 'formal papers, scheduled discussions, and face to face contact allowed superintendents to share the specialised knowledge of their craft and to seek guidance on subjects they found puzzling' (Vogel, 1989:246). While moves towards accounting uniformity and the creation of a professional association could have been coincidence, a case can be made for the transference of the 'best practice' from the UK.

7. Discussion and conclusions

This paper examines the creation and spread of Burdett's uniform system of accounts (1893) within UK voluntary hospitals, using Porter's elements (individuals, groups, institutions, concepts, forces and universals) to explore the complex process of change. The paper finds that forces, such as changes in medical technology and subsequent economic pressure on hospital funding, with the emerging concepts of efficiency, professionalism and managerialism, stimulated a number of individuals, groups and institutions to question the quality and usefulness of hospital accounting information. These groups included the Social Science Association and, later, the Hospital Association.

But it was another external institution, the Charity Organisation Society (COS) that proved the catalyst for accounting reform. COS was alarmed about poor hospital corporate governance, and alleged that hospitals manipulated their accounts to show deficits, in an effort to aid funding initiatives. Their trenchant criticisms of the free provision of out-patient care led, as a by-product, to their probing of hospital organisation and accounting. COS was able to marshal support for hospital accounting reform from another two institutions, the ICAEW and the House of Lords. The ICAEW provided essential technical expertise and professional legitimacy, while the possibility of State intervention, in the form of a House of Lords

Enquiry, appears to have been decisive in mobilising internal hospital institutions into defending the organisation of voluntary hospitals. These external institutions were essential conduits for accounting change, provoking action from individuals, groups and institutions more closely associated with the voluntary hospital movement.

A detailed examination of Porter's 'change agents' from 1888–1893 suggests that *internal* individuals, using a well-established hospital institution, the Sunday Fund, created a like-minded group from within the London Hospital establishment, and were able to control hospital accounting and, eventually, exclude the external institutions, COS and ICAEW, from accounting reform. Although there was a degree of similarity between all proposed accounts, 'Burdett's' were, in many respects, the least sophisticated of the possibilities on offer, and rationality is not therefore the key to understanding why these accounts were those eventually adopted. Other possible reasons are complex and, inevitably, subjective.

Voluntarism and local control were *universals* embraced by all groups and institutions and this, indirectly, provided support for Burdett and his supporters. The House of Lords' report, for example, while supporting uniform accounting, was reluctant to recommend any State intervention in the internal organisation of the hospitals. There may have also been a far more practical explanation. While COS and ICAEW were able to denounce hospital accounting practice, it was not, for either institution, a main-stream concern and, given the reluctance of the State to intervene, it appears that both COS and ICAEW were either unwilling, or unable, to convert 'criticism' into action.

This contrasts markedly with the internal individuals, groups and institutions, particularly Burdett, the Sunday Fund and later the Hospital Association. These internal groups, certainly within London, were controlled by a small 'elite group' of individuals, many of whom were close to Burdett, who appear to have been prepared to devote time and energy, and use their resources, in pursuing accounting reform.

The role played by the ubiquitous Burdett was also crucial in the process of change. His influence and power stemmed from his ownership, and editorship, of *The Hospital* journal, his high level contacts within key institutions and his personal friendships with hospital secretaries, such as Michelli. Burdett was also in the fortuitous position, as owner of the Scientific Press, to be able to quickly publish and present 'Burdett's' uniform accounts as a *fait accompli*, even before the final publication of the House of Lords' Report.

The success of the internal groups had far-reaching implications for hospital accounting information. It extended the principle of uniformity from accounting stewardship to performance measurement, by the inclusion of a detailed index of classification of costs and other statistical information, such as number of in-patients, out-patients and occupancy levels. Indeed for the next 50 years, we see attempts, particularly by the King's Fund, to use this data to compare hospital performance and to help drive resource-allocation decisions (Prochaska, 1992).

Central to the spread of uniform accounts is the influence of Burdett and his publications, economic forces in the form of funding institutions and the demand for professional homogeneity (DiMaggio and Powell, 1983), encouraged by the Hospital Association. It is this combination of individual advocacy, institutional power and professional orthodoxy that appears to have so completely achieved change. The economic force of the funding institutions can be over-emphasised (Cherry, 2000). All three of the main funding institutions accounted for only some 8% of total hospital income in 1899, but it was their role in promoting managerial reform, via hospital visits and inspections, that assisted the spread of the accounts.

With the creation of the Hospital Association there was the beginning of a professional network influencing the behaviour of hospital secretaries, and reinforced by the journals *The Hospital* and *Burdett's Hospital Annual*. Burdett's Scientific Press was quick to support, or perhaps exploit, the demand for uniformity by producing standard printed account books. There is limited, but interesting, evidence to suggest that accounting uniformity and managerialism spread from the UK to the US.

The development and diffusion of uniform accounting for hospitals suggests that the attempted use of accounting to measure and influence hospital performance and organisation has a long history and was a much earlier phenomenon than those associated with 'New Public Management' (Hood, 1991). This research implies that a multi-level explanation for accounting change avoids the over-reliance that could be placed on a single element, such as government intervention or economic forces, when exploring a complex change event. While external contextual influences on accounting policy formulation are important in stimulating change, the outcome, certainly in this case, is also intrinsically linked to the actions of individuals, groups and institutions. These well-organised, and connected, internal groups were able to resist incursions from the accounting profession and prevent them controlling hospital accounting information. This may partly explain why hospital, and indeed, charity accounting has received limited attention from the profession until the more recent past.

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Governance and takeovers: are public-to-private transactions different from traditional acquisitions of listed corporations?

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Abstract—Using a unique hand-collected dataset comprising 96 public-to-private (PTP) transactions and 258 acquisitions of listed corporations by existing corporate groups completed during the period 1998 to 2000, this paper investigates the extent to which PTPs have different internal and external governance and other characteristics from traditional acquisitions of listed corporations by existing corporate groups. The paper analyses acquisition activity during a period in which three new features were present: the decline in hostile takeovers, the increase in the adoption of governance Codes of Best Practice and the growth in PTP activity. PTPs are usually a response to takeover threat (Lehn and Poulsen, 1989) and so the paper analyses the acquisition decision from two perspectives: first, takeovers as a disciplinary mechanism which substitute for weak internal governance and second, as part of a non-disciplinary perspective where takeovers are complementary to internal governance mechanisms. We find support for the argument that improved internal governance and non-disciplinary takeovers, that is takeovers where the motive is not as a response to under-performing management, are complementary. PTPs are more likely to have higher board ownership and are likely to have duality of CEO and chairman. They are also more likely to have lower growth prospects and lower valuations. However, they do not have sub-optimal internal corporate governance structures in terms of lower proportions of outside directors. With respect to external governance, they are not more likely to experience pressure from the market for corporate control in the form of greater takeover speculation and are also not more likely to suffer hostile threats. We find that PTPs involving management buy-outs (MBOs) have fewer non-executive directors and a greater incidence of duality. MBOs also have higher board shareholdings. We find no evidence that management buy-ins (MBIs) have different characteristics. Our results suggest that going private by MBO may result from management's knowledge of private information that leads them to believe that the market has an incorrect perspective of the company's prospects.

1. Introduction

Corporate governance involves external and internal mechanisms. External mechanisms essentially concern the market for corporate control in which, in theory, underperforming management are disciplined and replaced following a successful hostile takeover bid. Internal governance mechanisms relate to the panoply of incentive and control mechanisms associated with board share ownership, board composition and external blockholdings of shares.

Important changes have occurred with respect to external and internal governance in the UK during the 1990s. First, there has been a decline in hostile takeover activity from a quarter of all acquisitions of UK listed companies in the mid-1980s (Franks and Mayer, 1996) to only 6.1% by the late 1990s (Weir and Laing, 2003), with a corresponding increase in friendly takeovers.[1] Second, there has been increased focus on the development of new 'best practice' codes for enhancing internal corporate governance through, for example the strengthening of corporate boards (Cadbury, 1992; Hampel, 1998, Combined Code 1998). These codes have particularly focused on enhancing managerial accountability (Short et al., 1999). Third, the period saw a significant increase in the number and value of public-to-private transactions (PTPs). Over the period 1991–1997, 4.8% of acquisitions involving publicly quoted companies

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[1] Even this split, however, may not accurately reflect the true situation. For example, Schwert (2000) argues that any initial rejection of an approach may simply indicate an attempt to get the bidder to enter into an auction process the purpose of which is to increase the value of the bid. In addition, Boone and Mulherin (2002) argue that the traditional definition ignores potential private auctions.

were PTPs. During 1998–2000, the figure rose to 23.7% with the figure increasing in each of these years. In addition, the value of assets taken private increased from £2,524m in 1998 to £9,363m in 2000 (CMBOR, 2003). The paper analyses these three trends.

While O'Sullivan and Wong (1999) consider the substitution of different governance mechanisms and find significant differences in internal governance between hostile takeovers[2] and firms that remain listed, the first two trends above raise important questions about the relationship between external and internal governance (Short et al., 1999; Dedman, 2003). In particular, they suggest that this relationship may have changed to one in which the market for corporate control and internal governance mechanisms are complements rather than substitutes. Improved internal governance may reduce the need for external governance, while the increase in friendly takeovers may reflect other non-disciplinary motives for acquisition. Non-disciplinary takeovers are takeovers where the motivation is not a response to under-performing management. Disciplinary takeovers are those that occur in response to under-performance by management (Manne, 1965; O'Sullivan and Wong, 2005).

In a PTP, the publicly owned equity of a company is acquired and the new company is taken private, creating a new independent entity. Typically, this new entity has enhanced governance and incentive mechanisms involving close monitoring by debt holders, private equity firms and significant equity stakes for executives. These mechanisms emphasise both accountability and the taking of entrepreneurial decisions by managers. In some of these firms, incumbent management may take significant equity stakes, creating a management buy-out (MBO), while in others equity may be largely held by new incoming management and the private equity financier, creating a management buy-in (MBI). MBOs and MBIs potentially raise different issues concerning access to information and governance.

The emergence of PTPs extends not only traditional perspectives on the market for corporate control but also the nature of internal governance. On the one hand, firms subject to PTPs may have inferior internal governance mechanisms prior to going private. Private equity firms with specialist monitoring expertise and contractual mechanisms represent a new external governance mechanism that involves taking these firms private and improving their internal governance. Alternatively, the development of corporate governance codes may lead to at least a prima facie convergence of internal governance mechanisms across firms. In these cases, PTPs may be more likely to occur where internal governance mechanisms focused on accountability in the context of stock market regulation constrain management's ability to undertake entrepreneurial decisions (Short et al., 1999).

The objective of this paper is to investigate the changes that occurred in the market for corporate control during the late 1990s. It evaluates the extent to which firms going private have different external and internal governance and monitoring characteristics from traditional acquisitions of listed corporations by existing corporate groups. As such, the paper aims to make the following contributions to the literature. First, it presents an analysis of acquisition activity during a period in which three new features have been present – the decline in hostile takeovers, the increase in the adoption of governance Codes of Best Practice and the growth in PTP activity. It therefore analyses the acquisition decision from two perspectives: takeovers as either disciplinary or non-disciplinary. The disciplinary perspective represents the traditional role of the market for corporate control in which poorly performing companies are bought and ineffective management is replaced. This context was used by, for example, Lehn and Poulsen (1989) to explain PTP activity. Given the decline in hostile, disciplinary acquisitions, the non-disciplinary approach attempts to analyse the market as it now appears to be operating. Separating acquired firms into PTPs and traditional acquisitions of listed corporations provides valuable additional insights into developments in the external monitoring process. Within this context we analyse the role of board ownership as an influence on the decision to go private. Second, our focus extends both previous work on PTPs that has examined the growth prospects, free cash flow and market for corporate control hypotheses relating to the acquisition of firms (Jensen, 1986), and previous work on internal governance in takeovers (O'Sullivan and Wong, 1999). It does this by incorporating the impact of internal governance mechanisms and the role of ownership structure on the decision to go private. Third, we analyse how far public-to-private buy-outs can be viewed as a homogeneous group by comparing incumbent-led buy-outs (MBOs) with those led by outsiders (MBIs).

Our findings show that PTPs and traditional acquisitions of listed corporations differ in terms of certain aspects of external and internal governance and monitoring mechanisms. In terms of internal governance mechanisms, there is no evidence of differences in terms of non-executive directors although there is more likely to be duality of CEO and chairman. There is also no evidence that they had more free cash flow but their growth prospects were lower. Therefore, with respect to the traditional disciplinary role of hostile takeovers, we find limited evidence that PTPs were more likely to suffer from agency costs but they did not experience a greater threat of hostile takeover. However, we do find that public-to-private acquisitions had higher board shareholdings than traditional acquisitions of listed corporations, which is further support for the view that recent PTPs cannot be explained in terms of a reaction to the threat of disciplinary takeover brought about by high agency costs.

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[2] The analysis of publicly quoted firms that have been acquired tends to be undertaken using one of the following methodologies. (1) the comparison of characteristics of acquired firms with those of non-acquired firms (e.g. Palepu, 1986); (2) the comparison of firms acquired in hostile and non-hostile takeovers (e.g. Martin and McConnell, 1991; Franks and Mayer, 1996; Kennedy and Limmack, 1996); (3) a comparison of the characteristics of firms acquired by friendly takeover with those of non-acquired firms (e.g. Song and Walkling, 1993; Nuttall, 1999); and (4) a comparison of firms involved in hostile acquisitions with those of non-acquired firms (e.g. Shivdasani, 1993).

We find support for the hypothesis that we can differentiate between PTPs and traditional acquisitions of listed corporations within a non-disciplinary perspective. We find that some firms going private have lower valuations, indicating managerial private information, and greater board ownership suggesting that outside bidders have been deterred from bidding for the firms because of the potential difficulties involved in dealing with significant board ownership.

The issue of board ownership is investigated further by comparing high board ownership PTPs and low board ownership PTPs with traditional acquisitions of listed corporations. High board ownership PTPs have higher free cash flows and lower growth prospects. In addition, they have fewer non-executive directors and more duality. However, they also have higher internal ownership and do not face greater pressure from outside bidders than traditional acquisitions of listed corporations. This suggests that board ownership and board structure are substitute governance mechanisms. It is also consistent with the fact that, although there is greater awareness about board mechanisms, shareholders may be willing to accept a board structure that appears non-optimal. However, high board ownership PTPs do have an average of two independent non-executive directors, which is consistent with the 1998 Combined Code on Corporate Governance prevailing at the time of the study. They also have an average of 36% non-executive directors, which is above the figure quoted in the Combined Code. This suggests that PTPs do not suffer non-desirable non-executive director representation. In addition, Hampel (1998) recognises that duality may be appropriate for smaller firms, something which is true for high board ownership PTPs.

Our findings also show that PTPs that are MBOs have a higher incidence of duality and fewer non-executive directors. However, the percentage of non-executive directors is in line with the 1998 Combined Code. MBOs also have higher board ownership. Therefore, going private implies that the management has private information about the prospects of the firm, which is not reflected in the stock market's view of the company. Overall, our findings emphasise the importance of a non-disciplinary explanation for PTPs relative to traditional acquisitions of listed corporations.

The paper is structured as follows. In the next section the literature relating to acquisitions and PTPs is discussed. Then the data and research design are outlined in Section 3. The results are discussed in Section 4 and the analysis development in Section 5. Finally, some conclusions are drawn in Section 6.

2. Previous literature and hypothesis development

A number of differences between public-to-private (PTP) takeovers and other acquisitions of listed corporations have important internal governance implications. First, a PTP means that the company will have been taken out of public control and will no longer be quoted on the stock market. Therefore, the company will cease to be subject to public monitoring and hence will not incur the bonding and monitoring costs associated with being publicly quoted. In contrast, a publicly listed corporation acquired by another publicly listed corporation is still to some degree, even if it is indirectly, subject to the effects of public monitoring through analysts' scrutiny of its parent. Second, public-to-private transactions tend to involve private equity firms who typically take significant equity stakes and board representation (CMBOR, 2003).[3] Third, the funding structure following the PTP usually involves a higher proportion of debt (CMBOR, 2003). In contrast, acquisition by another public company may be more likely to see the continuation of a relatively low proportion of debt in the funding structure, even where the acquisition is funded by increased borrowings by the bidder (Sudarsanam and Mahate, 2003).[4] This implies increased monitoring subsequent to going private.

In this section, we first consider the substitution arguments regarding differences in traditional disciplinary hostile takeover activity between PTPs and traditional acquisitions of listed corporations. We consider the differences between PTPs and traditional acquisitions of listed corporations in terms of the traditional arguments for going private, namely weak governance associated with agency problems, excess free cash flows, poor growth prospects, low board shareholdings and the threat of hostile takeover. Second, we consider the complementarity arguments with respect to the growing awareness of internal governance mechanisms during a period of a decline in hostile acquisitions and a rise in non-disciplinary takeovers. We evaluate the differences between PTPs and traditional acquisitions of listed corporations in relation to a non-disciplinary environment in which management perceptions about market undervaluation and management insider knowledge are likely to play a greater part in the decision to go private.

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[3] Over the period 1998–2000, 79.4% of all PTPs involved private equity firms. The figure increases as the value of the PTP increases, with private equity firms being involved in 91.9% of PTPs that were in excess of £50m (CMBOR, 2003).

[4] Sudarsanam and Mahate (2003) find that over the period 1983–1995 in the UK, 18.7% of acquisitions were financed by only cash, 19.8% by only equity and 61.5% by a mixture of the two. In contrast, over the period 1991–2000, debt provided an average of 42.4% of the funding of UK PTP transactions, (CMBOR, 2003).

We are not aware of any study that has attempted to differentiate between PTPs and traditional acquisitions of listed corporations in a period when non-hostile acquisitions are the rule.[5] Halpern et al. (1999) compared leveraged buy-outs (LBOs) with a random sample of traditional acquisitions of listed corporations during 1981–86, a time when hostile acquisitions were much more common in the US than now.[6] They found that the probability of engaging in an LBO increased as managerial share ownership increased and was higher if takeover interest had been reported in the Wall Street Journal. They found no evidence of any difference in either growth prospects or free cash flows.

2.1. *Disciplinary takeovers and substitutability*

Hostile takeovers are traditionally viewed as a key mechanism for disciplining under-performing managers. A substantial literature examines traditional acquisitions during periods of significant hostile takeover activity. For example, O'Sullivan and Wong (1999) consider the substitution of different governance mechanisms and find significant differences in internal governance between hostile takeovers and firms that remain listed. In addition, the likelihood of significant turnover of senior management of the acquired firm following takeover (Kennedy and Limmack, 1996; Franks and Mayer, 1996; Dahya and Powell, 1999; Kini et al., 2004) suggests that the threat of hostile acquisition would provide the impetus to return some of the residual claims to other shareholders. This suggests that in general, PTPs are more likely to be associated with a disciplinary hostile takeover threat than are traditional acquisitions of listed corporations.

Firms involved in PTP transactions have traditionally been argued to have characteristics associated with incentive misalignment and poor monitoring prior to the decision to go private and so will have incurred higher agency costs than traditional acquisitions of listed corporations (Jensen, 1986). Firms going private are expected to be in mature, low growth sectors with high free cash flow, with the PTP transaction enabling the return of some of the free cash flow to shareholders as a result of improved governance and incentive realignment post-buy-out. Traditional acquisitions of listed corporations are less likely to exhibit these characteristics because if they did, there would have been pressure to take the firms private. Corporate acquirers may be able to obtain synergy benefits from acquiring low growth firms but may find firms with low growth prospects are less attractive.

The US evidence regarding the extent of free cash flow in PTPs is, however, mixed. Lehn and Poulsen (1989) find that firms going private had higher free cash flows than firms that remained quoted. Other evidence suggests that free cash flow has no impact on the decision to go private (Opler and Titman, 1993; Halpern et al., 1999) and there is no evidence that other takeovers in general have high free cash flows (Morck et al.,1988; Powell, 1997). Similarly, the US evidence on the growth of PTPs relative to other acquisitions is again mixed, with Lehn and Poulsen (1989) supporting this argument while other studies using different measures find that firms going private did not have poorer growth prospects than firms remaining public (Opler and Titman, 1993; Halpern et al., 1999).

However, agency costs associated with high free cash flows and low growth prospects may induce the threat of a hostile, disciplinary takeover which substitutes for weak governance and poor incentive alignment (Jensen, 1986; Lehn and Poulsen, 1989). The first wave of PTPs in the US was subjected to more takeover speculation in the financial press than firms that remained public (Lehn and Poulsen, 1989). In addition, Halpern et al. (1999) report that firms involved in PTPs were more likely to experience takeover speculation than traditional acquisitions of listed corporations. If PTPs did exhibit the characteristics of poor growth prospects, high free cash flows, poor stock market performance and low board ownership, they would be susceptible to a disciplinary, outside bid.

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[5] The literature on public-to-private transactions tends to compare PTPs with firms that remain public, (e.g. Halpern et al., 1999; Kaplan, 1989; Lehn and Poulsen, 1989; Maupin et al., 1984; Kieschnick 1998; Weir et al., 2005a). Alternatively it looks at the impact of PTPs on the share price, (e.g. DeAngelo et al., 1984; Frankfurter and Gunay, 1992; Torabzadeh and Bertin, 1987).

[6] Their discussion stresses the importance of the threat of hostile takeover but does not indicate the composition of their control sample of acquired firms in terms of the proportions of hostile or non-hostile acquisitions.

The argument that going private is a response to the threat of hostile takeover also has implications for the governance structures of firms since it implies that the threat is a substitute for non-optimal boards. In the UK, the 1998 Combined Code[7] identified significant non-executive director representation as a means of bringing effective monitoring to ensure that policies consistent with shareholder objectives are followed by the board. Given the Combined Code's emphasis on a meaningful non-executive director presence, we would expect firms going private to have fewer non-executive directors than firms subject to traditional acquisitions by existing listed corporations.

The above discussion gives the following hypotheses in terms of distinguishing between PTPs and traditional acquisitions of listed corporations where PTPs are being driven by the incentive realignment model. Firms going private are more likely than traditional acquisitions of listed corporations to have: lower growth prospects (hypothesis H1a); higher free cash flows (hypothesis H1b); ineffective internal board governance structures (hypothesis H1c); lower board ownership (hypothesis H1d); lower valuation (hypothesis H1e); and greater takeover speculation (hypothesis H1f).

2.2. *Non-disciplinary takeovers and complementarity*

There has been growing awareness of the impact of effective internal governance mechanisms as a result of a number of reports (Cadbury, 1992; Greenbury 1995: Hampel, 1998). The increased effectiveness of internal governance mechanisms has happened during the same period as the decline in hostile takeovers. As internal governance improves, it becomes more difficult for managers to protect their own interests by rejecting a bid, hence the reduction in hostile takeovers. In the UK, significant adoption of the recommendations made by the 1998 Combined Code (Peasnell et al. 2003; Dahya et al. 2002) has coincided with the increase in friendly takeovers. This suggests that the market for corporate control and internal governance mechanisms are complements rather than substitutes.

In addition, Franks and Mayer (1996) and Kini et al. (2004) both argue that we can no longer view hostile takeovers as disciplinary (as proposed in Morck et al. (1988), for example) because there is no evidence that hostile targets and non-hostile targets perform differently. For example, there is evidence that friendly targets are not poor performers, (Morck et al., 1988; Franks and Mayer, 1996; Powell, 1997; Weir, 1997; North, 2001). Thus Franks and Mayer (1996) conclude that bid hostility is now a consequence of disagreement about the terms of the deal arising from valuation differences rather than a disciplinary mechanism. Kini et al. (2004), who study a period in the US during which the incidence of hostile takeovers was lower, argue that the traditional concept of hostility no longer applies because the disciplinary role of the market for corporate control has been replaced by anti-takeover defences and the growing importance of internal corporate governance mechanisms. The use of anti-takeover mechanisms is much less common in the UK (Sudarsanam, 2003). Accordingly, in the UK context, we emphasise internal governance as a complement to the decline in hostile takeovers given that the decline happened at the same time as the improvement in internal governance mechanisms.

(a) Internal governance mechanisms

In the UK, the 1998 Combined Code on Corporate Governance identified two key internal mechanisms for controlling managerial discretion.[8] First, as noted earlier, significant non-executive director representation (Fama, 1980; Rosenstein and Wyatt, 1990; Cadbury, 1992) brings the necessary objectivity, skills and experience that enable effective monitoring to ensure that policies consistent with shareholder objectives are followed by the board. The 1998 Combined Code recommended that boards should have at least one third non-executive directors (the 1992 Cadbury Code of Best Practice recommended at least three non-executive directors, a number not changed in the Combined Code). Dahya et al. (2002) show that in the post-Cadbury Code of Best Practice period, the resultant increase in non-executive directors appears to have made the removal of a poorly performing CEO more likely.

The second important governance mechanism identified in the Combined Code relates to duality, the situation where one person takes on the posts of both chairman and CEO. The Combined Code takes the view that, unless the company is small, duality is undesirable given the degree of control and influence that it gives to one person in the decision-making process.

The influence of duality on performance and the takeover process is not, however, simple. For example, contrary to expectations, Boyd (1995), using US data, finds that duality improved performance. Further, UK studies by Vafeas and Theodorou (1998) and Weir et al. (2002) report that it had no adverse effect on performance. In the US, Shivdasani (1993) finds that duality reduced the probability of a hostile bid. In the UK, O'Sullivan and Wong (1999) find an insignificant relationship between the presence of duality and the likelihood of becoming a hostile target. Duality may also be a signal of strong leadership (Baliga et al., 1996).

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[7] The Combined Code has had a number of revisions, for example, 2006 (Combined Code, 2006). The study deals with a period in which the original 1998 Combined Code was applicable.

[8] UK quoted companies have been adopting the internal governance structures recommended in the 1998 Combined Code (Peasnell, et al., 2003; Dahya et al., 2002), particularly with the appointment of additional non-executive directors and in reducing the incidence of duality. There is no legal requirement to adopt these structures but companies must include a governance statement in their accounts detailing how far they have implemented the Combined Code of Best Practice.

The development of corporate governance codes will lead to a convergence of internal governance mechanisms, especially where adoption is high, (Ezzamel and Watson, 2005). Thus, the predominance of non-disciplinary takeovers suggests that PTPs and traditional takeovers of listed corporations by existing corporate groups are likely to have similar board characteristics.

(b) Management undervaluation perceptions

As noted earlier, Franks and Mayer (1996) and Kini et al. (2004) argue that the rejection of an initial hostile bid approach is now a function of the disagreement about a bid's terms arising from valuation differences. In the absence of hostile takeovers, valuation differences are not disciplinary in nature but result from management having private, inside information. There is some evidence that PTPs are undervalued relative to firms that remain public. Weir et al. (2005b) distinguish between perceived and objective undervaluation. They find, in respect of the former, that PTPs experience a decline in share price relative to firms that remain public. This suggests that the managers had some private information that led them to value the company differently from the market. If the market does not value this information, incumbent management may see listing costs as an unnecessary burden. The management of traditional acquisitions of listed corporations would not have had such a different valuation otherwise they would have set in motion a PTP. We therefore expect that PTPs will be undervalued relative to traditional acquisitions of listed corporations.

(c) Insider ownership

Board ownership is likely to be higher in firms going private than in traditional acquisitions of listed corporations. Specifically with respect to PTPs, Halpern et al. (1999) report that firms involved in LBOs have significantly higher managerial share ownership than those involved in traditional acquisitions of listed corporations. Where founders remain in position in listed corporations, a desire for independence to realise their growth objectives may lead them to resist becoming part of a larger group. If they have retained a significant share of equity they may be able to resist pressure for takeover by another corporation. Potential acquirers may be dissuaded from purchasing such businesses because of the potential problems in integrating dominant founders. In contrast, these businesses may be attractive PTP candidates as the private equity firms funding them are likely to seek to support good entrepreneurial management and also have the specialist expertise and contractual mechanisms to monitor them (Sahlman, 1990; Wright and Robbie, 1998). As a result, we hypothesise in general that firms going private are expected to have higher internal shareholdings than traditional acquisitions of listed corporations.

The above discussion leads to the following hypotheses for distinguishing between PTPs and traditional acquisitions of listed corporations in a non-disciplinary perspective. Compared to traditional acquisitions of listed corporations, PTPs are: not more likely to have lower growth prospects (hypothesis H2a); not more likely to have higher free cash flows (hypothesis H2b); not more likely to exhibit poorer board governance structures (hypothesis H2c); more likely to have higher board ownership (hypothesis H2d); more likely to experience undervaluation (hypothesis H2e); and not more likely to experience more takeover speculation (hypothesis H2f).

3. Data and research design

3.1. Sample

The sample consists of 354 UK quoted acquisitions. Of these, 96 were public-to-private transactions and 258 were other publicly quoted companies that were acquired during the period 1998 to 2000. To be included, acquired companies have to have complete financial and governance data available. We exclude acquisitions of companies in the financial services sector. Firms in this sector have non-standard accounts and cannot be compared to firms in the other sectors. They are also subject to external scrutiny by the Financial Services Authority which means that the usual governance-agency issues may not apply. Over the period there were 500 acquisitions of UK public companies. Of these, 100 were in the financial services sector and 46 had missing or incomplete data. This gives the final sample of 354.

The PTP and acquisitions data were collected from a number of sources. First, we used data from *Acquisitions Monthly*, which publishes information on acquisition activity in the UK. Second, data on the public-to-private transactions were supplied by the Centre for Management Buyout Research, which is based at the University of Nottingham, and the Financial Times Intelligence Service. Financial information used to calculate sales growth, free cash flow and capital expenditure was taken from Extel Primark Company Analysis, which provides accounting and financial data on UK quoted companies. The figures used were taken from the last accounts published prior to the acquisition. Thus, if the acquisition occurred in 1998, the data refer to the accounts published in 1997. The corporate governance and shareholding data were taken from the PricewaterhouseCoopers Corporate Register (1998, 1999, 2000, and 2001) which provides information on internally held shareholdings and external shareholdings in excess of three percent. It also gives details of board structure. Ownership and board structure data also refer to the year prior to the year of takeover. Information on takeover rumours came from FT Intelligence, which provides newspaper text reports.

3.2. Variable definition

The variables used in the analysis are defined as follows:

Dependent variable

Y is a binary dependent variable. It takes the value one if the acquisition was a PTP and zero if a company was acquired by other means.

Independent variables

PIND is the percentage of independent non-executive directors on the board. To be defined as independent, a non-executive director must not have previously been an executive director of the company or an advisor to the company. Also excluded are directors that are related to executive directors or who work for firms with large shareholdings.

NX3 is a binary variable that takes the value one if a company has at least three non-executive directors, at least two of which are independent, and zero otherwise. This is an alternative measure consistent with the 1998 Combined Code of Best Practice.

DUALITY is a binary variable. It is equal to one if the posts of CEO and chairman are held by the same person and zero if they are not.

CODE is a binary variable that measures the extent to which companies have adopted the Code's two key board structures. It has the value one if a company splits the posts of CEO and chairman and has at least three non-executive directors, two of whom are independent, and zero if not.

FCF measures a company's free cash flow. It is defined as the percentage of operating cash flow minus interest, taxes and dividends divided by sales in the period relating to the last accounts published prior to the acquisition.

SALESG measures the company's growth prospects (Lehn and Poulsen, 1989). It is defined as the rate of growth of sales over the two years prior to being acquired.

TAKEOVER represents the market for corporate control and is defined in two ways:

(a) RUMOURS is a dummy variable that takes a value of one if there had been press coverage of bid speculation in the period three months to 15 months prior to the announcement of either a PTP transaction or of being acquired by an existing corporate group, and zero if not.

(b) TOINTENSITY measures the extent of takeover pressure faced by firms in their sector. It is the number of firms taken over in each *Financial Times* Classification category as a percentage of the number of firms in that category.[9] This would also capture industry-specific effects such as the general market conditions, product life cycle effects and technological effects.

BRDSH is the percentage of issued capital owned by the whole board.[10]

BRDSH2 is the percentage of issued capital owned by the board deflated by total assets.

VALUE is a measure of the perceived undervaluation of the acquired firm. Based on Weir et al. (2005b), it is defined as the market capitalisation in the year prior to acquisition deflated by the market capitalisation in the previous year, which represents a benchmark year.

Control variables

High capital expenditure is indicative of the use of funds on projects that will produce negative net present values (Halpern et al., 1999), because it suggests managerial discretionary behaviour. However, as Long and Ravenscraft (1993) and Lichtenberg and Siegel (1990) argue, lower capital expenditure will increase the ability of going private firms to service the increased post-PTP debt. Hence we introduce the control variable, CAPEX, which measures net capital expenditure. It is defined as spending on new buildings, property and equipment minus depreciation, divided by the book value of total assets expressed as a percentage. We also control for size and industry (North, 2001). Size is LNTA, the natural log of total assets.

Industry effects influence takeover activity (Mitchell and Mulherin, 1996). These were initially going to be measured by industry dummies. However, the small number of PTPs in certain sectors created a singular matrix. To overcome this problem, significant numbers of sectors would have had to be omitted from the regressions. For example in Table 3, 30% of the sector classifications would have had to be omitted. In Table 4, 35% of the high board shareholdings sectors would have had to be omitted and 40% from the low board shareholding sectors. It was concluded that the loss of so many sectors would have cast doubt on the results, so industry effects are measured by takeover pressure in the firm's sector. Thus TOINTENSITY was also used to measure industry effects because a significantly higher, or lower, value will indicate industry differences.

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[9] We would like to thank Professor Sudi Sudarsanam for this suggestion.

[10] Previous studies have generally used managerial ownership. Where the extent of shareholdings has been distinguished between executive and non-executive directors, the latter are typically extremely low. For example, O'Sullivan and Wong (1998; 1999) find the non-executive shareholdings in hostile targets are around 1–1.25% on average and in friendly targets and non-acquired firms are around 1.7–2.8%. They also find that the size of non-executive shareholdings is insignificant in explaining differences between acquired and non-acquired firms and between friendly and hostile targets.

3.3 Methodology

Given the binary dependent variable, the analysis was undertaken using logistic regression. In logistic regression, the probability of a firm being involved in a PTP, P_i, is the expected value that a firm is involved in a PTP given the values of the explanatory variables X_i

$$P_i = E\langle y_i = 1 | X_i \rangle$$
$$= \frac{1}{1+e^{-y_i}}$$

Where E is the expected value, y_i=1 is a firm going private and X_i is an N x k matrix of independent explanatory variables.

We report the logit coefficients for y_i

The general model estimated is:

$$y_i = \beta_0 + \beta_1 SALESG_i + \beta_2 FCF_i + \beta_3 PIND_i + \beta_4 DUALITY_i + \beta_5 BRDSH_i + \beta_6 VALUE_i + \beta_7 RUMOURS_i + \beta_8 LNTA_i + \beta_9 CAPEX_i \quad (1)$$

Other model specifications analysed included the variables:

$$\beta_{10} TOINTENSITY_i, \beta_{11} NX3_i, \beta_{12} CODE_i$$

Given the first set of hypotheses discussed above, we expect the following for the disciplinary and substitutability perspective –

$$\beta_1 < 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 < 0, \beta_7 > 0, \beta_{10} > 0, \beta_{11} < 0, \beta_{12} < 0$$

β_8 and β_9 are not specified a priori as they are control variables.

Thus it is hypothesised that PTPs are more likely to have lower growth (SALESG), higher free cash flows (FCF), fewer independent non-executive directors (PIND and NX3), a greater incidence of duality (DUALITY), lower board ownership (BRDSH), lower market valuation (VALUE) and be more likely to experience takeover speculation (RUMOURS and TOINTENSITY) than other traditional acquisitions. No sign is specified for size (LNTA) or for capital expenditure (CAPEX). We also expect that PTPs are less likely to comply with the Combined Code (CODE). The expected signs of the coefficients are explained in Table 1 Panel A.

For the second set of hypotheses relating to the non-disciplinary and complementarity perspective, we expect:

$$\beta_1 = 0, \beta_2 = 0, \beta_3 = 0, \beta_4 = 0, \beta_5 > 0, \beta_6 < 0, \beta_7 = 0, \beta_{10} = 0, \beta_{11} = 0, \beta_{12} = 0$$

β_8 and β_9 are not specified a priori as they are control variables.

Thus PTPs are more likely to have higher board ownership (BRDSH) and lower valuation (VALUE) that other traditional acquisitions. With

Table 1
Summary of hypotheses and expected directions of relationships

Panel A: Disciplinary perspective

Coefficient	*Expectation*	*Explanation*
β_1	Negative	A lower SALESG indicates higher agency costs (hypothesis H1a)
β_2	Positive	A greater FCF indicates higher agency costs (hypothesis H1b)
β_3	Negative	A greater PIND indicates more effective internal board governance (hypothesis H1c)
β_4	Positive	DUALITY indicates less effective internal board governance (hypothesis H1c).
β_5	Negative	A lower BRDSH indicates a lack of financial incentive effects (hypothesis H1d)
β_6	Negative	A lower valuation VALUE indicates poorer stock market performance (hypothesis H1e)
β_7	Positive	Greater takeover speculation (RUMOURS) indicates more effective external governance (hypothesis H1f)
β_8	n.a.	LNTA No hypothesised direction as control variable for size of firm
β_9	n.a.	CAPEX No hypothesised direction as control variable for amount of capital expenditure
β_{10}	Positive	TOINTENSITY – an alternative measure to RUMOURS for takeover pressure
β_{11}	Negative	NX3 – an alternative measure to PIND for role of non-executive directors
β_{12}	Negative	CODE – a combined alternative measure to PIND and DUALITY for internal governance

Table 1
Summary of hypotheses and expected directions of relationships *(continued)*

Panel B: Non-disciplinary perspective

Coefficient	*Expectation*	*Explanation*
β_1	Insignificantly different from zero	There will be no difference between the SALESG of PTPs and other traditional acquisitions. (hypothesis H2a)
β_2	Insignificantly different from zero	There will be no difference in the extent of FCF between PTPs and other traditional acquisitions. (hypothesis H2b)
β_3	Insignificantly different from zero	There is no difference in the representation of PIND between PTPs and other traditional acquisitions. (hypothesis H2c)
β_4	Insignificantly different from zero	There will be no difference in the incidence of DUALITY between PTPs and other traditional acquisitions. (hypothesis H2c).
β_5	Positive	BRDSH is more likely to be higher in PTPs that in other traditional acquisitions. (hypothesis H2d)
β_6	Negative	Perceived firm valuation VALUE is likely to be lower for PTPs than for other traditional acquisitions. (hypothesis H2e)
β_7	Insignificantly different from zero	There will be no difference in the extent of RUMOURS of PTPs and other traditional acquisitions. (hypothesis H2f)
β_8	n.a.	LNTA No hypothesised direction as control variable for size of firm
β_9	n.a.	CAPEX No hypothesised direction as control variable for amount of capital expenditure
β_{11}	Insignificantly different from zero	TOINTENSITY – an alternative measure to RUMOURS for takeover pressure
β_{12}	Insignificantly different from zero	NX3 – an alternative measure to PIND for role of non-executive directors
β_{13}	Insignificantly different from zero	CODE – a combined alternative measure to PIND and DUALITY for internal governance

Note: SALESG is the percentage change in sales over the two years prior to being acquired. FCF is operating cash flow minus interest, taxes and dividend divided by sales. PIND is the percentage of independent non-executive directors on the board. DUALITY is a dummy variable that has a value of one if the posts of CEO and chairman are undertaken by a single person and zero if they are separated. BRDSH is the percentage of issued capital owned by the board. VALUE is the market capitalisation at the time of the last published accounts divided by the market capitalisation the year before. RUMOURS is a dummy variable that takes a value of one if there had been press coverage of bid speculation in the period three months to 15 months prior to the announcement of either going private or being acquired and zero if not. LNTA is the natural log of total assets. CAPEX is the percentage net capital expenditure over total assets. TOINTENSITY is the percentage of firms in an industrial sector that were taken over in a particular year. NX3 is a dummy variable that takes the value one if a board has at least three non-executive directors of whom at least two are independent and zero if not. CODE is a dummy variable that has the value one if a company has at least three non-executive directors, at least two of whom are independent, and zero if not.

n.a. is not applicable.

Table 2
Descriptives and univariate analysis

	Whole sample (n=354)			*PTP (n=96)*		*Acquired (n=258)*			
	Min	*Max*	*Mean*	*Mean*	*Median*	*Mean*	*Median*	*Z test*	*Median Chi-square*
BRDSH (%)	00.1	75.31	11.11	17.16	7.76	8.86	2.91	4.05***	9.66***
CODE	0	1	0.53	0.43	0	0.58	1	5.52**	
DUALITY	0	1	0.20	0.28	0.00	0.17	0.00	2.21***	4.92**
RUMOURS	0	1	0.31	0.32	0	0.30	0	0.44	0.19
TOINTENSITY (%)	0	30	7.75	7.16	6.76	7.95	6.90	0.87	0.75
VALUE	0.18	9.45	0.99	0.91	0.83	1.01	0.88	0.52	0.72
SALESG (%)	–54.27	169.09	9.20	6.08	1.81	10.35	6.64	1.90	3.65
PIND (%)	0	80	38.79	36.55	40.00	39.62	40.00	1.15	0.06
NX3	0	1	0.62	0.56	1	0.65	1	1.60	
FCF (%)	–163.79	51.33	3.89	5.10	3.41	3.43	4.40	–0.64	0.91
CAPEX (%)	–92.68	79.65	5.56	4.30	5.30	6.02	6.28	0.78	2.05
TOTAL ASSETS (£m)	3.02	8595.00	289.17	150.01	52.55	331.07	62.44	1.04	1.42

Note: ** – significant at the 5% level; *** – significant at the 1% level
Mann Whitney Z test used for all variables except chi square test applied to the dummy variables CODE, NX3, DUALITY, RUMOURS, and TOINTENSITY.
No median test for CODE and NX3 because all values less than or equal to the median.
BRDSH is the percentage of issued capital owned by the board. CODE is a dummy variable that has the value one if a company has at least three non-executive directors, at least two of whom are independent, and zero if not. DUALITY is a dummy variable that has a value of one if the posts of CEO and chairman are undertaken by a single person and zero if they are separated. RUMOURS is a dummy variable that takes a value of one if there had been press coverage of bid speculation in the period three months to 15 months prior to the announcement of either going private or being acquired and zero if not. TOINTENSITY is the percentage of firms in an industrial sector that were taken over in a particular year. VALUE is the market capitalisation at the time of the last published accounts divided by the market capitalisation the year before. SALESG is the percentage change in sales over the two years prior to being acquired. PIND is the percentage of independent non-executive directors on the board. NX3 is a dummy variable that takes the value one if a board has at least three non-executive directors of whom at least two are independent and zero if not. FCF is operating cash flow minus interest, taxes and dividend divided by sales. CAPEX is the percentage net capital expenditure over total assets. TOTAL ASSETS is current assets plus fixed assets.

the exception of size, (LNTA) and capital expenditure (CAPEX) for which no signs are specified, all other variables are expected to be insignificant. The expected signs of the coefficients are explained in Table 1 Panel B.

4. Empirical results

4.1. Sample characteristics

Table 2 reports the sample descriptives and univariate analysis. In terms of ownership, the mean BRDSH is 11.11% with 20% of the sample having board shareholdings in excess of 20%. The board structure statistics show that 20% of the sample has one person undertaking the dual roles of CEO and chairman. Boards have an average of 39% independent non-executive directors, above the one third recommended in the Combined Code. We also find that 62% have at least three non-executive directors, of whom at least two were independent. Further, 53% combine no duality with at least three non-executive directors and two independent non-executive directors.

In terms of pressure from the market for corporate control (RUMOURS), 31% of firms experience press rumours about possible takeover in the previous year and an average of 7.75% of firms in each sector were taken over (TOINTENSITY). Average sales growth (SALESG) is 9.2% with 32% of the sample experiencing falling sales indicating poor growth prospects. The mean free cash flow (FCF) for the sample is 3.89% with 84% of firms having positive free cash flows. On average, the sample valuation measure VALUE is 0.99. Some 59% of the sample has valuation measures below 0.95, with 55% below 0.90, which suggests that targets in general experience falling market valuations prior to acquisition.

The mean capital expenditure (CAPEX) is 5.56% with 28% of firms spending in excess of 10% of the value of their assets on capital projects. The mean size of acquired firms (TOTAL ASSETS) is £289.17m.

Univariate comparison of PTPs and acquired firms is undertaken using median, non-parametric Mann-Whitney and chi-square tests. We find insignificant differences in free cash flow. There is also no significant difference in the extent to which the two groups experience takeover speculation. Neither is there any significant difference in the takeover intensity in different sectors. We find only one PTP is the result of an actual hostile takeover (Hillsdown), with another bid being accepted rather than incur a hostile fight (Sears). In addition, if we define takeover pressure in terms of actual previous unsuccessful bids, only 5% of firms going private are specifically reported as receiving a failed hostile bid in the previous year. This is consistent with Maupin et al. (1984) who find that PTPs are predominately friendly. In terms of traditional acquisitions of listed corporations, again only 5% are actually reported as having had a failed hostile bid in the previous year. These figures are in line with the low level of hostile takeovers in the UK. Press speculation therefore suggests a reasonably active market for corporate control but the lack of failed bids does not suggest that going private is a response to fear of takeover and an active market for corporate control. There is also no significant difference in relation to valuation. In terms of board structure, we report that firms going private have a significantly higher frequency of duality and fewer non-executive directors, although the latter is not significant. However, both PTPs and traditional acquisitions of listed corporations have more than the recommended minimum percentage of non-executive directors. The NX3 dummy is also insignificant. Firms going private have significantly fewer cases of adopting both of the 1998 Combined Code's recommended board structures. We also find that PTPs have significantly higher board shareholdings than traditional acquisitions of listed corporations. Finally, sales growth is also significantly lower for PTPs These results therefore indicate that we can differentiate between PTPs and traditional acquisitions of listed corporations in an environment where there is a general absence of hostile takeovers.

4.2. Multivariate results

Table 3 presents the logistic regression results. A number of models are tested. Model 1 shows the basic analysis. Model 2 introduces an alternative market for corporate control variable, TOINTENSITY. Models 3 and 4 analyse the impact of alternative specifications of the 1998 Combined Code of Best Practice using NX3 and CODE, respectively.

We find little support for the disciplinary perspective hypotheses. The results show that PTPs are more likely to have significantly lower growth prospects (SALESG) and more duality than traditional acquisitions of listed corporations. There is also some evidence of lower valuations. However, we find no significant difference in relation to free cash flows,[11] the percentage of non-executive directors (both measures) being insignificant, takeover speculation (both measures) being insignificant, or the adoption of the Combined Code's recommendations. PTPs are also more likely to have significantly higher board share-

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[11] We also test a different definition of free cash flow. Capital expenditure may also represent spending on negative net present value projects so we combined free cash flow and capital expenditures. The variable was insignificant in all equations suggesting that the lack of importance of free cash flow is not sensitive to changes in definition.

Table 3
Logistic regression explaining the differences between PTPs (n=96) and traditional acquisitions of listed corporations (n=258)

	Model 1	*Model 2*	*Model 3*	*Model 4*
RUMOURS	0.3616		0.3593	0.3470
	(1.29)		(1.28)	(1.24)
TOINTENSITY		–0.0252		
		(0.84)		
PIND	–0.0016	–0.0010		
	(0.20)	(0.12)		
NX3			–0.0704	
			(0.24)	
DUALITY	0.5938	0.5322	0.5925	
	(1.93)*	(1.71)*	(1.93)*	
CODE				–0.4417
				(1.61)
FCF	0.0282	0.0108	0.0127	0.0137
	(1.06)	(0.92)	(1.06)	(1.10)
BRDSH	0.0381	0.0370	0.0381	0.0372
	(4.23)***	(4.15)***	(4.27)***	(4.21)***
LNTA	0.0084	0.0273	0.0126	0.0217
	(0.08)	(0.27)	(0.12)	(0.20)
CAPEX	–0.0058	–0.0057	–0.0056	–0.0050
	(0.64)	(0.62)	(0.62)	(0.55)
VALUE	–0.4112	–0.3995	–0.4131	–0.4131
	(1.69)*	(1.57)	(1.69)*	(1.62)
SALESG	–0.0123	–0.0131	–0.0124	–0.0129
	(1.90)*	(2.02)**	(1.92)*	(1.96)**
Constant	–1.2037	–0.9731	–1.2395	–0.9529
	(1.92)*	(1.48)	(2.26)**	(1.82)*
Chi-square	34.76***	33.83***	34.77***	33.54***

Note: t values on parentheses
*** – significant at the 1% level; ** – significant at the 5% level; * – significant at the 10% level.
RUMOURS is a dummy variable that takes a value of one if there had been press coverage of bid speculation in the period three months to 15 months prior to the announcement of either going private or being acquired and zero if not. TOINTENSITY is the percentage of firms in an industrial sector that were taken over in a particular year. PIND is the percentage of independent non-executive directors on the board. NX3 is a dummy variable that takes the value one if a board has at least three non-executive directors of which at least two are independent and zero if not. DUALITY is a dummy variable that has a value of one if the posts of CEO and chairman are undertaken by a single person and zero if they are separated. CODE is a dummy variable that has the value one if a company has at least three non-executive directors, at least two of whom are independent, and zero if not. FCF is operating cash flow minus interest, taxes and dividend divided by sales. BRDSH is the percentage of issued capital owned by the board. LNTA is the natural logarithm of total assets. CAPEX is the percentage net capital expenditure over total assets, where total assets current assets plus fixed assets. VALUE is the market capitalisation at the time of the last published accounts divided by the market capitalisation the year before. SALESG is the percentage change in sales over the two years prior to being acquired.

holdings than traditional acquisitions of listed corporations. PTPs also have significantly lower valuations (VALUE) than traditional acquisitions of listed corporations. All models are significant at the 1% level.

In terms of the non-disciplinary perspective, we find that board shareholdings are higher for PTPs and valuation is lower, both as hypothesised. We find that PTPs are more likely to combine the posts of CEO and chairman.[12] Although, contrary to expectations, we find lower growth prospects, the insignificant results for free cash flows, takeover speculation, non-executive director representation and Combined Code adoption all lend weight to the non-disciplinary perspective. The positive coefficient for duality may reflect the fact that firms going private tend to be younger and are therefore more likely to have founders still in post (Weir et al., 2005c). It may, in the Combined Code period, with its 'comply or explain' approach, also reflect an acceptance by shareholders that internal governance mechanisms are appropriate for the company and should not be regarded as a negative attribute. Given the increased awareness of corporate governance issues, the existence of duality may indicate a positive statement by shareholders.

The results therefore show that we can differentiate between PTPs and traditional acquisitions of listed corporations and that the differences can be explained within a perspective in which we see the decline of the disciplinary takeover as a substitute for ineffective governance. The differences are consistent with non-disciplinary acquisitions which act as a complement to improving governance.

5. Analysis development

The analysis was developed in three ways. First, in terms of board shareholdings; second in relation to differences between MBOs, MBIs and traditional acquisitions of listed corporations; and third in terms of the actual hostile pressure. The disciplinary perspective argues that it will be difficult to replace entrenched management because their high insider ownership and voting rights may protect them from the threat of takeover (Fama and Jensen, 1983). We therefore expect that firms going private, that have high board shareholdings, will not experience pressure from the threat of takeover. We also expect that, consistent with Jensen (1986), they will have higher free cash flows and lower growth opportunities than traditional acquisitions of listed corporations. It is also maintained that management will have a financial incentive to go private, given their higher shareholdings. We find support for this given that the mean value of shareholdings for high ownership PTPs is £23.2m whereas the mean value for traditional acquisitions of listed corporations is £6.67m (Z=5.69, p<.001).

The disciplinary perspective also argues that at low levels of inside ownership, inside owners pursue non-value maximising objectives by consuming large amounts of perks and/or engaging in suboptimal investment behaviour. Therefore, there is a misalignment of interests at both low and high levels of internal ownership.

Within a non-disciplinary perspective, we expect no evidence of outside takeover pressure for PTPs with high board ownership. This is consistent with buyers being put off by the possibility of being faced with a board that may not be willing to sell. We also expect that these PTPs will experience lower valuations relative to traditional acquisitions of listed corporations. In contrast, firms involved in PTPs that have low board shareholdings are unlikely to be entrenched and will not be able to so easily resist a bid. We would therefore expect that there will be no significant difference between these firms and traditional acquisitions of listed corporations, since both are targets that involve outside management buying into the firm.

To analyse the impact of board ownership, firms involved in PTPs were split into two clusters, high and low board ownership.[13] Cluster analysis was used to identify groups within data. Firms were included in a particular cluster by minimising each firm's Euclidean, or straight line, distance from the cluster's mean.

The PTP low board shareholding cluster has a mean of 6.46% and the high ownership cluster a mean of 44.54%. The difference is significant at 1% indicating that PTPs can be split into two groups according to board shareholding (Z equals 5.93 and p<.000). The high board cluster includes PTP board shareholdings greater than or equal to 27.5% with the low shareholding group being less than 27.5%.The low ownership cluster includes 69 PTPs and the high ownership cluster has 27 PTPs.

Table 4 presents the logistic regression results for both of the board shareholdings sub-samples. As in Halpern et al. (1999), each PTP cluster is regressed against all traditional acquisitions of listed corporations. We find that firms going private that are in the large cluster are smaller than the traditional acquisitions of listed corporations (Mann Whitney Z=1.95, p=0.05). Given that smaller firms are likely to have higher board ownership (Mikkelson and Partch, 1989); Song and Walkling, 1993), we deflate board ownership by total assets

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[12] The results are therefore consistent with studies such as Kini et al. (1995) and Weir et al. (2002) that show substitutability between agency mechanisms.

[13] Morck et al. (1988) use piecewise regression but recognise that there is an element of trial and error in finding the appropriate turning point(s). Halpern et al. (1999) use cluster analysis to split PTP board shareholdings into high and low board ownership. We follow this approach.

Table 4
Impact of shareholdings on the probability of differentiating between PTPs and traditional acquisitions of listed corporations.

[High board shareholdings, PTP n=27; low board shareholdings, PTP n=69. In both cases other traditional acquisitions of listed corporations n=258].

	High board shareholdings			*Low board shareholdings*		
	Model 5	*Model 6*	*Model 7*	*Model 8*	*Model 9*	*Model 10*
RUMOURS	0.3137	0.3445	0.3764	0.1556	0.1558	0.1550
	(0.60)	(0.66)	(0.73)	(0.52)	(0.52)	(0.52)
PIND	–0.0293			–0.0023		
	(1.63)			(0.25)		
NX3		–1.0371			–0.0799	
		(2.10)**			(0.26)	
DUALITY	1.2829			0.3467	0.3472	
	(2.62)***			(0.99)	(1.00)	
CODE			–1.7348			–0.3570
			(3.26)***			(1.27)
FCF	0.0434	0.0479	0.0490	0.0029	0.0029	0.0030
	(1.79)*	(1.94)*	(1.96)**	(0.23)	(0.23)	(0.23)
VALUE	–0.8078	–0.8893	–0.8391	–0.1817	–0.1783	–0.1857
	(1.44)	(1.54)	(1.48)	(0.62)	(0.61)	(0.63)
BRDSH2	0.3531	0.3614	0.3649	–0.1718	–0.1748	–0.1939
	(3.62)***	(3.78)***	(3.87)***	(0.99)	(0.99)	(1.09)
SALESG	–0.0215	–0.0268	–0.0287	–0.0039	–0.0039	–0.0040
	(1.67)*	(2.00)**	(2.10)**	(0.70)	(0.70)	(0.69)
CAPEX	0.0165	0.0227	0.0220	–0.0102	–0.0099	–0.0098
	(0.81)	(1.13)	(1.11)	(1.14)	(1.12)	(1.10)
Constant	–1.7236	–2.0144	–1.5293	–1.0279	–1.0720	–0.8464
	(2.08)**	(2.96)***	(2.56)**	(1.95)*	(2.65)***	(2.31)**
Chi-square	35.57***	37.39***	23.76***	7.61	7.61	8.06

Note: t values in parentheses
*** – significant at the 1% level; ** – significant at the 5% level; * – significant at the 10% level
RUMOURS is a dummy variable that takes a value of one if there had been press coverage of bid speculation in the period three months to 15 months prior to the announcement of either going private or being acquired and zero if not. PIND is the percentage of independent non-executive directors on the board. NX3 is a dummy variable that takes the value one if a board has at least three non-executive directors of whom at least two are independent and zero if not. DUALITY is a dummy variable that has a value if one of the posts of CEO and chairman are undertaken by a single person and zero if they are separated. CODE is a dummy variable that has the value one if a company has at least three non-executive directors, at least two of whom are independent, and zero if not. FCF is operating cash flow minus interest, taxes and dividend divided by sales. VALUE is the market capitalisation at the time of the last published accounts divided by the market capitalisation the year before. BRDSH2 is the percentage of issued capital owned by the board deflated by total assets. SALESG is the percentage change in sales over the two years prior to being acquired. CAPEX is the percentage net capital expenditure over total assets, defined as current assets plus fixed assets.

to take account of potential size effects (variable BRDSH2).

Splitting the sample into high and low ownership PTPs reveals significant differences between the PTP subgroups and traditional acquisitions of listed corporations. High board ownership PTPs have significantly higher board ownership concentration, higher free cash flows and lower growth prospects. As expected, we find no evidence of pressure from outside bidders for high board ownership firms going private. There is evidence that duality is more common and that PTPs are less likely to have at least three non-executive directors, two of whom are independent. The negative CODE variable also shows that PTPs are less likely to have adopted the recommended board structures as laid down in the 1998 Combined Code.

However, the average number of independent non-executive directors for high board ownership PTPs is 2.03, which is at the level recommended in the 1998 Combined Code. The key factor in the governance structure is that 44% of high board ownership PTPs have duality whereas only 14% of traditional acquisitions of listed corporations have it. The extent to which this is undesirable, however, is not clear given that Hampel (1998) recognises that duality may be appropriate for small firms. High board ownership PTPs are smaller than traditional acquisitions of listed corporations so that the results do not suggest poor governance, merely different governance structures. Given that 25 out of 27 (93%) PTPs in the high board shareholding group are management buy-outs (MBOs), the results suggest that going private is driven by management that has a different perspective on the advantages of remaining public.[14]

As expected, the low board shareholdings PTPs exhibit no significant differences relative to traditional acquisitions of listed corporations. Given the involvement of outside buyers, and the lack of hostility, there is no reason to differentiate between the choice of targets. What is not clear is why some firms went private and others did not. There are, however, a number of possibilities. First, the buyer is a private company, for example Philip Green's purchase of Sears. Second, the specialist knowledge of a venture capitalist may make certain firms more attractive. Third, the amount of funding required is small enough to make venture capitalists interested.

The second development relates to the fact that so many of the high board shareholding cluster were MBOs, which raises the issue of whether or not there are separate identifiable sub groups even within PTPs. This was analysed by means of multinomial logistic regression which allows us to separate data into more than two categories. In this case there are three choices – MBO, MBI and traditional acquisitions of listed corporations.

Greene (1997) shows

$$\Pr(y_i = j) = \frac{\exp(\beta'_j X_i)}{1 + \sum_{k=1}^{J} \exp(\beta'_j X_i)}$$

where Pr is probability, i is the i^{th} firm and j is the j^{th} outcome and k is number of outcomes, which in our case are MBO, MBI or traditional acquisitions of listed corporations. X_i is the matrix of explanatory variables. Therefore, the model measures the probability (P_i) that a firm will belong to outcome j, an MBO or MBI, rather than a traditionally acquired firm, given characteristics X_i. The reference group comprised traditionally acquired firms in both cases so that the regressions produce two sets of coefficients, the first referring to MBOs relative to traditional acquisitions of listed corporations and the second to MBIs relative to traditional acquisitions of listed corporations. To overcome the problem of indeterminacy, the normalisation $\beta_0=0$ is used (Greene, 1997). The multinomial logistic results are given in Table 5. We only report the MBO-traditional acquisitions of listed corporations results because the period under study was one in which non-hostile acquisitions were the norm. Given that MBIs involve external buyers, we expect them to exhibit the characteristics associated with a friendly takeover, relative to traditional acquisitions of listed corporations. In this case, we would not expect any differences between MBIs and traditional acquisitions of listed corporations. The results support this. All variables and equations for MBIs were insignificant and hence are not reported.

Table 5 shows that MBOs are more likely to have significantly higher board shareholdings than traditional acquisitions of listed corporations. The shareholding result is consistent with that in Table 3 given that MBOs dominate the PTP sample and tend to exhibit higher board shareholdings than MBIs (22.02% and 7.78% respectively, $z=4.09$, $p=0.01$). MBOs also have fewer non-executive directors. However, MBOs do have an average of 32.5% non-executive directors on their boards, which shows that they are not out of step with the recommended one-third of the 1998 Combined Code. However, MBOs are more likely to have the same person acting as CEO and chairman and the negative CODE variable shows that they are less likely to adopt both recommended board structures. It is also found that MBOs are not more likely to experience takeover rumours than traditional acquisitions of listed corporations. Nor are they undervalued, have higher free cash flows or experience lower growth relative to traditional acquisitions of listed corporations.

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[14] The regressions were run using just the 25 management buy-outs. The results were similar to those discussed above.

Table 5
Multinomial logistic regression explaining the differences between MBOs (n=62) and traditional acquisitions of listed corporations (n=258)

	Model 12	*Model 13*	*Model 14*	*Model 15*
RUMOURS	0.3115	0.2909	0.2793	0.4374
	(0.96)	(0.90)	(0.87)	(1.32)
PIND	–0.0230			–0.0222
	(2.40)**			(2.34)**
NX3		–0.5726		
		(1.85)*		
DUALITY	0.7150	0.6736		0.6559
	(2.10)**	(1.99)**		(1.92)*
CODE			–0.8996	
			(2.94)***	
FCF	0.0125	0.0132	0.0146	0.0098
	(0.86)	(0.91)	(0.99)	(0.66)
VALUE	–0.3787	–0.3782	–0.3591	–0.3403
	(1.30)	(1.32)	(1.21)	(1.14)
BRDSH2	0.1560	0.1664	0.1704	
	(1.98)**	(2.14)**	(2.22)**	
CAPEX	–0.0107	–0.0073	–0.0068	–0.0120
	(1.06)	(0.72)	(0.67)	(1.18)
SALESG	–0.0087	–0.0111	–0.0118	–0.0085
	(1.16)	(1.43)	(1.49)	(1.18)
Constant	–0.5410	–1.0686	–0.8046	–0.8155
	(1.07)	(2.74)***	(2.24)**	(1.55)
Chi-square	21.51***	19.32**	18.32**	29.21***

Note: t values on parentheses
*** – significant at the 1% level; ** – significant at the 5% level; * – significant at the 10% level.
RUMOURS is a dummy variable that takes a value of one if there had been press coverage of bid speculation in the period three months to15 months prior to the announcement of either going private or being acquired and zero if not. PIND is the percentage of independent non-executive directors on the board. NX3 is a dummy variable that takes the value one if a board has at least three non-executive directors of whom at least two are independent and zero if not. DUALITY is a dummy variable that has a value if one of the posts of CEO and chairman are undertaken by a single person and zero if they are separated. CODE is a dummy variable that has the value one if a company has at least three non-executive directors, at least two of whom are independent, and zero if not. FCF is operating cash flow minus interest, taxes and dividend divided by sales. VALUE is the market capitalisation at the time of the last published accounts divided by the market capitalisation the year before. BRDSH2 is the percentage of issued capital owned by the board deflated by total assets. SALESG is the percentage change in sales over the two years prior to being acquired. CAPEX is the percentage net capital expenditure over total assets, defined as current assets plus fixed assets.

These results suggest that MBO managers have inside information that is not known to the market and that they believe that the market's long-term view of the company is incorrect. This is consistent with anecdotal statements by private equity financiers of public-to-private MBOs (CMBOR, 1999). Therefore, there is an incentive to buy out the company and to remain in charge of it rather than let the market continue to undervalue it, as perceived by the management.

The third development relates to the way in which pressure from the market for corporate control is measured. The speculation variable refers to the reporting of press takeover speculation. However, press rumours tend to be vague and non-specific and merely state that there is speculation about a bid. Usually there is little concrete information about, for example, the identity of the potential bidder. It may be that the rumours relate to a possible MBO rather than an outside, hostile buyer. Therefore to address that point, a new variable was generated which had the value one if there had been a failed hostile bid during the previous year and zero if there had not. It was run for all the models in Tables 2, 3 and 4 and was insignificant in all of them. Thus, there was no significant hostile pressure for PTPs in general, or for each of the subsets of MBOs and MBIs, which provides further support for the non-disciplinary perspective providing a suitable means within which to analyse takeover activity.

6. Conclusions

This paper has explored the governance and other characteristics of acquired quoted firms during a period in which the vast majority of publicly quoted acquisitions were non-hostile and where there had been developments in internal governance. Given that PTPs are regarded as a response to a hostile takeover threat, and the late 1990s witnessed the growth of non-hostile takeovers, we developed a first set of propositions (H1a to H1f) relating to expected differences between PTPs and traditional acquisitions of listed corporations by existing corporate groups from a disciplinary perspective where the external takeover market is expected to substitute for weaknesses in internal governance. We developed a second set of propositions (H2a to H2f), concerning the same set of variables, relating to the expected differences between PTPs and traditional acquisitions of listed corporations by existing corporate groups. These propositions were developed from a non-disciplinary perspective where the external takeover market is expected to complement internal governance mechanisms.

Support for the disciplinary/substitutability perspective comes from the fact that PTPs are more likely to have lower growth prospects than traditional acquisitions of listed corporations by existing corporate groups (hypothesis H1a is supported but hypothesis H2a is not supported). In contrast, support for the non-disciplinary/complementarity perspective was found with PTPs not being more likely to have greater free cash flows than traditional acquisitions of listed corporations by existing corporate groups (Hypothesis H1b is not supported but hypothesis H2b is supported). With respect to the role of internal governance mechanisms, we find support for the non-disciplinary/complementarity perspective as PTPs do not have sub-optimal internal corporate governance structures in terms of lower proportions of outside directors but are more likely to have duality of CEO and chairman.[15] (Hypothesis H1c is not supported but hypothesis H2c is supported). The non-disciplinary/complementarity perspective is further supported as PTPs are more likely to have higher board ownership (hypothesis H1d is not supported but hypothesis H2d is supported). There is mixed support across different model specifications for hypotheses H1e and H2e relating to whether PTPs are more likely to be undervalued or not, and thus no clear support for one perspective in preference to the other. With respect to external governance, PTPs are not more likely to experience takeover speculation or more hostile interest. Hence these firms are not under greater disciplinary pressure from the market for corporate control, indicating support for the non-disciplinary/complementarity perspective (hypothesis H1f is not supported but hypothesis H2f is supported). These findings are contrary to the view that hostile takeovers substitute for weaknesses in internal corporate governance.

Further insights were gained by separating PTPs into high or low board shareholdings and MBOs or MBIs. Splitting PTPs into high and low board shareholding groups provides evidence that the boards in firms going private appear to be entrenched, particularly when board shareholdings are high. It was also shown that MBOs have higher board ownership and fewer non-executive directors than traditional acquisitions of listed corporations. Their non-executive director representation complies with the 1998 Combined Code, which indicates that non-executive director representation is not sub-optimal. They have more duality but given the Combined Code's 'comply or explain' basis, duality may not necessarily be undesirable.

The results offer support for the argument that internal governance and the rise in friendly takeovers are complementary. The growth in public-to-private activity in the UK occurred when hostile takeovers were rare and where compliance with internal governance codes was high. Our findings raise the prospect that an important explanation for going private by MBO is that incumbent management possess private information, which leads them to believe that the market has an incorrect perspective of the company's prospects. A delisting would therefore enable the management to operate in conditions that did not carry with them the public perception that the company was a poor performer. As hypothesised, MBIs did not have different governance and ownership characteristics and were no different from traditional acquisitions of listed corporations. This suggests that MBIs simply provide an additional form of external acquisition vehicle.

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[15] We argued earlier that duality may be regarded positively in an age of greater corporate governance awareness. In addition, Baliga et al. (1996) argue that duality may signal strong leadership.

Our results raise a number of additional research questions. First, the extent of CEO and other executive director turnover post-PTP may provide additional insights into the desire to avoid public monitoring by going private. Second, it may also be worth exploring directly whether PTPs take place as a result of the regulatory burden of being listed. The finding of higher board shareholdings in PTPs, together with anecdotal evidence, hints that disaffected entrepreneurs who remain in control of listed companies de-list them to economise on regulatory costs and to implement restructuring and growth strategies away from the public gaze.

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The impact of depreciation-type adjustments on the distribution of accounting earnings

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Abstract—In this paper, experimental, computer simulation methods are used to demonstrate how a depreciation-type adjustment influences the distributional form of accounting earnings. The results confirm conjectures that earnings distributions generally, with or without depreciation adjustments, tend towards a normal form as a function of increasing 'activity' levels. They also indicate that depreciation is likely to accelerate the transition towards a normal form as activity levels increase and to transform a non-normal form to one that is significantly closer to the normal at relatively low activity levels. The impact of the fixed asset 'impairment' rules is also investigated. The results reported in the paper have implications for standard-setting, risk analysis and inference using accounting earnings and related numbers, including ratios based upon earnings.

1. Introduction

This paper reports the results of a series of computational experiments investigating the statistical properties of accounting numbers. It uses Statistical Activity Cost Theory (SACT) to model the impact of the depreciation adjustment on the form of the probability distribution of accounting earnings. It extends previous work based upon the same theory, which shows how the depreciation adjustment may reduce the variance of accounting earnings (e.g. Lane and Willett, 1997).

The paper is motivated by both theoretical and practical considerations and an interest in the statistical properties of accounting numbers. Concern has been diverted away from measurement aspects of accounting theory in recent years by a focus upon disclosure and user-related aspects of accounting. However, there remain important unanswered questions, relating to the purpose and usefulness of depreciation-type adjustments, that the approach taken in this paper addresses. This has the potential to inform the manner in which accounting information could be better derived, disclosed and used.

The results of the experiments reported in this paper demonstrate hitherto unknown properties of depreciation-type adjustments. By *depreciation-type adjustments* is meant accounting entries that are added to or subtracted from earnings, which utilise information about the expected time duration and lifetime costs of activities to supplement the information provided by accrued transaction (invoice) costs. Such adjustments are shown to affect the shape as well as the dispersion of the statistical distribution of accounting earnings. Specifically, depreciation-type adjustments that use reasonably accurate estimates of lifetimes and expected costs improve, more or less dramatically, the approximation of the distribution of undepreciated earnings to the normal distribution. Moreover, as the analysis of the impairment provisions shows, ignoring new information or incorporating changes in depreciation-type calculations in the absence of objective data reduces or negates this effect.

The theoretical framework and modelling approach demonstrated here could be a useful addition to the technical armoury supporting policy choices of standard-setters. The assessment of the 'quality' of earnings is a key concern. To what extent may a depreciation-type adjustment enhance the quality of earnings? It is difficult to see how such a question can be adequately answered without a systematic and rigorous method for evaluating the relative merits of alternative earnings calculations according to some criteria. The findings also have implications for the analysis of risk in financial reporting and cognate areas such as management accounting and auditing. Additionally, they have significance for empirical work using regression analysis containing earnings or functions of earnings variables, including financial ratios.

The next section of the paper briefly reviews

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prior research relevant to the issue at hand. Section 3 then provides the motivational background to the paper. Section 4 discusses the modelling framework and this is followed by more detail in Section 5 outlining the method used and the variables examined in the computer experiments. After Section 6 describing the approach to analysing the samples, the results of the experiments are presented in two parts. Section 7 reports the results on the limiting form of the earnings distribution. Section 8 reports the results of experiments concerning the distributional form that earnings, whether inclusive of a depreciation adjustment or not, takes at relatively low activity levels. Section 9 extends the results to assess the effect on earnings of depreciation practices recommended by accounting standards dealing with the impairment of fixed assets. The skewness apparent in earnings at low activity levels is also discussed. Section 10 concludes with a summary and short discussion of the more general implications of the paper.

2. Relevant prior research

The modelling procedure used here is based upon an axiomatic theory of accounting measurement (Willett, 1987, 1988). This theory implies that accounting measurement procedures can be conceptually constructed on the basis of a single, key concept of an 'activity cost'. By interpreting activity costs as being generated by underlying economic, stochastic processes, this leads to the idea of a 'statistical activity cost' and to a consideration of the general nature of the distributional form of earnings (Willett, 1991b). Intuitively, the theory underlying statistical activity costs is consistent with Activity Based Costing (Cooper, 1990) but is precise and rigorous in the way it defines the basic concepts of activities and costs. It has been conjectured that any accounting number could be modelled as a special type of function of random sums of random activity costs (Willett, 1991a). It is the application of this idea to accounting earnings that provides the basis for the results reported in this paper.

Based upon some relatively general assumptions regarding the nature of underlying economic processes, it was conjectured that the undepreciated segment of earnings should possess a normal form of limit distribution at high levels of activity and that the depreciation adjustment had the potential to reduce the variance of this distribution around its long-term mean value (Willett, 1991b:123–126). This was supported by the first simulation experiments using SACT (Willett, 1991b:127–131) and later confirmed via mathematical analysis in Lane and Willett (1997).

The theory and modelling framework described by SACT has been applied to a variety of theoretical problems such as the measurement of market values and goodwill (Hodgson et al., 1993) and the statistical analysis of standard cost variances (Booth and Willett, 1996). A review of the theory and its applications is contained in Gibbins and Willett (1997). A brief but comprehensive report on computer experiments investigating these and other issues is to be found in Gibbins et al., (1998), which in addition contains a basic statement of the role of accounting numbers in economic models and theories. A more specific commentary on the application of the statistical activity cost viewpoint of accounting numbers to the economic theory of production functions is provided in Willett (1998). Some insight into the use of the theory in capital market research is given in Biekpe et al., (1998). In practice, depreciation-type adjustments of the kind studied in this paper can act as an automatic earnings-smoothing device. The quantitative significance and policy implications of this property were investigated by Hillier and McCrae (1998). An application of SACT to the properties of the accountant's matching principle is contained in Su (2005) and a general review of statistical approaches to accounting, including recent developments in SACT, is presented in Falta and Wolff (2004). Most recently the theory has been applied to modelling asset maintenance costs in Royal Australian Navy vessels (e.g. see Colin et al., 2006).

One of the original motivational forces behind the development of the statistical activity cost interpretation of the depreciation adjustment was to answer the so-called 'allocation problem in financial accounting' (Thomas, 1969; 1974) the point of SACT being that there is a rational, unequivocal statistical basis for choosing whether or not to depreciate and how to depreciate long-term costs. Among the most important precursors to statistical activity costing are Littleton (1953) for the focus on transaction costs, Mattessich (1964) and Ijiri (1965) for their attention to the processes that generate the transactions costs and Brief and Owen (1970) for identifying the possibility of treating accounting numbers as statistics. Examples of related viewpoints in the accounting literature are aspects of activity based costing (Cooper, 1990) and Richardson's (1994) comments on the inadequacy of point estimates in financial disclosure. The underlying and general concern of this literature, whether it employs methods based upon mathematical analysis, computer experiments, archival data analysis, case studies or historical and comparative research, is how it is possible to gain an improved knowledge of the technical measurement aspects of accounting numbers. Such knowledge is viewed as a prerequisite to a better understanding of their 'information value' (Milburn, 1994) and 'decision relevance' (Gibbins and Willett, 1997).

3. Motivation

Basic to the motivation, modelling approach and assessment of the results contained in this paper is the idea, referred to above, that earnings numbers statistically represent underlying economic processes or activities in which the firm is engaged.[1,2] The specific aim is to model the quantitative influence of depreciation and similar adjustments, all of which, in some manner, average activity costs over time. The focus is the impact of the depreciation-type adjustment on the shape of the distribution of earnings. This focus reflects theoretical work indicating the potential for the depreciation-type adjustment to impact the distribution of earnings beyond that of the variance parameter demonstrated in Lane and Willett (1997).

The need to account for fixed assets, expenditures on investments in intangibles (such as research and development), construction projects and other activities spanning multiple periods is a long-standing problem in earnings measurement theory that has major implications for disclosure practice and policy. The interpretation in SACT, unlike other approaches taken to accounting measurement (e.g. Beaver, 1998), is that depreciation-type adjustments to earnings are not arbitrary or without empirical referents. Rather, these adjusting calculations are viewed as potential control variables, which may be evaluated according to the statistical properties they impart to earnings. This interpretation of the depreciation-type adjustment allows the behaviour of earnings numbers to be evaluated with respect to their accuracy in representing observable economic events.

The modelling of earnings numbers reported in this paper uses a variety of differing inputs, forms of depreciation calculation and levels of underlying economic parameters. Previous research shows that the use of a depreciation adjustment can reduce the variance of earnings in comparison to an earnings number arising under identical economic circumstances and computed under identical accounting procedures, excepting for the omission of depreciation (Lane and Willett, 1997; Willett, 1991b). Of equal significance to the variance of earnings as an estimator is the question of the influence of the depreciation-type adjustment on the shape of earnings distributions. A basic question is the representativeness of any single earnings number. Consider, for instance, the case of sampled values of undepreciated earnings (i.e. realised earnings, before depreciation, disclosed in a particular period's financial statements) concentrating around one or more points relatively far from the mean. Little confidence could then be placed in any given undepreciated earnings number being a good indicator of ongoing profitability. This could happen even if the variance of the distribution of earnings was small – as for instance could be the case with certain types of multi-modal distributions. The research reported here provides a detailed map of the potential for the depreciation-type adjustment to impact the reliability of earnings as a representation of firm performance under such circumstances.

A further matter is the legitimacy of the use of standard methods of inference based upon the normal distribution. If depreciation-type adjustments can transform an otherwise non-normal distribution to a near-normal distribution, the adjustment has obvious utility from an inferential perspective. Such implications bear not only on inferences made with earnings numbers themselves but, as alluded to earlier, also on inferences using financial ratios in which earnings is a component and, in fact, on any inferences made in empirical analysis in which earnings play a role. The current modelling significantly clarifies the scope for the use of normal inference in earnings-based empirical studies. This point is returned to in the last section of the paper.

The broad issue addressed here is, hence, the distributional forms of earnings arising from long-term activities, i.e. the sum of activity costs and depreciation-type adjustments arising via accounting procedures for fixed assets, intangibles, long-term contribution-generating projects and other activities with duration expected to exceed one accounting period.[3] Two aspects of the distributional properties of accounting earnings are considered. The first aspect, its asymptotic or limiting form as the number of activities increases, is likely to be primarily of theoretical interest and of significance as a benchmark. Here the focus is on the existence and nature of convergence (with respect to the level of activities) to a limiting form of distribution, relative to the use of depreciation in the earnings calculation. The second aspect, the non-limiting forms of the distribution of earnings, is of wider, practical relevance. Here the focus is on the nature of the depreciation-induced transformation of earnings distributions at low, often more realistic, levels of activity. This aspect illustrates the potential of the statistical activity cost interpretation of accounting numbers to cast new light on the 'engineering' implications of constructing complex accounting numbers.

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[1] 'Firm' is used generically to denote any economic organisation which typically discloses a summary earnings or income number in its financial statements.

[2] 'Activities' are precisely defined constructs and modelling structures in statistical activity cost theory. See Willett (1988) and Gibbins and Willett (1997).

[3] The role of the variance in differentiating earnings distributions across alternative earnings functions is not considered in this paper due to the focus on the distributional form of earnings and the need to contain the length of the material.

$$DA[t\text{-}1,t) = \sum_{k=1}^{k=m} \sum_{j=1}^{j=N_k^e} f_k(t - S_{jk}, C^*_{jk}, D^*_{jk}) \mid S_{jk} < t \leqslant S_{jk} + D_{jk}, D^*_{jk} > 1$$
$$- \sum_{k=1}^{k=m} \sum_{j=1}^{N_k^e} \sum_{i=1}^{i=t-1-s_{jk}} f_k(i, C^*_{jk}, D^*_{jk}) \mid t - 1 \leqslant S_{jk} + D_{jk} < t, D^*_{jk} > 1 \quad (3)$$

Secondary to the basic question of the influence of depreciation is the effect of potential variation in the preparer's inputs of activity cost and duration estimates to the calculation of earnings. The estimated forms of earnings reported in this paper reflect a range of preparer knowledge about the economic circumstances of the firm. The robustness of the statistical properties of earnings to variation in the underlying economic parameters is an important consideration in establishing the scope for practical application and for the policy implications of this research. The experiments described later therefore establish a set of basic results using a number of different preparer estimates and plausible variations in economic parameters.

4. Modelling framework and method

In the theory described in the previous sections of this paper, earnings numbers are viewed as constructs of an underlying database of activities' costs and 'production relations'. Modelling is founded on expressing earnings as an additive function of random activity costs, start times and durations, taking into account depreciation and possibly other forms of provision-type adjustments. Activity costs, start times and durations are associated with probability generating processes reflecting a combination of market demand and supply conditions and the existing, in-place technologies of firms. The depreciation adjustment itself is generated by a specified depreciation function, with estimated activity costs and durations as arguments.

The Monte Carlo simulation method is used to examine the distributional properties of earnings. The advantage of this approach, relative to mathematical analysis, is its ability to investigate the often analytically intractable compound probability processes invoked by the SACT framework. The modelling environment reflects the requirement to represent a set of activities over an interval within the indefinite lifetime of a firm. The modelling environment employed here is a development of the approach used in Willett (1991b). However, important refinements are introduced – in particular, a single partitioning regime for homogeneous observations and an extended activity generating process ensuring stationarity in activity levels and other dimensions of the activity set.[4]

Two simplifying restrictions are imposed that limit the scope of the models. First, modelling is conducted at the level of a single class of activities. A class is a homogeneous type of activity, meaning that for each dimension of cost, start time and duration time, across activities of that type, values are sampled from identical distributions. Since activity costs are additive and by construction 'cover' all costs and activities in an accounting entity (Willett, 1991a; Hillier, 1999), a single class per experiment is not unduly restrictive in terms of generality. The main limitation is that the activity variables are assumed independent within and across activities. Second, the data generating processes considered are stationary, a point that is explained in the next section. The effect of correlation of activities' variables and non-stationarity on the results reported in this paper are questions left for future research.

5. Formulation of earnings as a statistical function and experimental design

The earnings formulation is based on Willett (1991b:122).[5] That is accounting earnings for the accounting period from t-1 to t are defined as,

$$E[t\text{-}1,t) = UE[t\text{-}1,t) + DA[t\text{-}1,t) \quad (1)$$

where $UE[t\text{-}1,t)$ represents the earnings that would be computed in the absence of a depreciation adjustment and $DA[t\text{-}1,t)$ the adjustments that are made for depreciation for the accounting period from $t\text{-}1$ to t. These two components of earnings are defined in terms of basic model variables as:

$$UE[t\text{-}1,t) = \sum_{k=1}^{k=m} \sum_{j=1}^{j=N_k^e} C_{jk} \mid t - 1 \leqslant S_{jk} + D_{jk} < t \quad (2)$$

and (3), see box above.

The upper case random variables C_{jk}, S_{jk} and D_{jk} represent the activity cost, start time and duration time respectively of the *j*'th activity in the *k*'th activity class. Asterisks denote estimates of the relevant variables. N_k^e is the random number of activities of class *k* obeying the condition that the activities finished in period $[t\text{-}1, t)$ and were thus equities at t, as indicated by the superscript e. N_k^a is, in contrast, the random number of activities of class *k* that had begun during $[t\text{-}1, t)$ but were still unfinished at t and were thus assets at t, indicated by the superscript a. $f_k(.)$ is the particular form of the depreciation function applied to activities of class k in the calculation of earnings. In the discussion below, lower case, conditioning variables s_{jk}, d_{jk} and c_{jk} are realised values of the start time, duration time and activity cost of the respective random variables.

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[4] A full account of the development and nature of the modelling environment is provided in Hillier (1999).

[5] This is also the genesis of the form used in Lane and Willett (1997).

The function described by the combined expressions (2) and (3) reflect accounting measurement practices regarding the calculation of earnings as follows. Expression (2) consists of the aggregation of costs incurred in all the m classes of a firm's activities, each class k containing $j = N_k^c$ completed activities in a given accounting period. Completed activities include long-term activities such as fixed assets that have an expected duration in excess of one accounting period ($D^*_{jk} > 1$). Expression (3) describes the depreciation adjustment (DA) and applies only to classes of activity (again indexed by k) that are long-term, i.e. $D^*_{jk} > 1$. For all such classes, the first part of the right-hand side of expression (3) aggregates depreciation charged in the accounting period for the j activities continuing beyond the end of the accounting period ($j = N_k^a$). The depreciation charge is a function of elapsed time since the beginning of the activity (t-S_{jk}) the expected total net cost at activity completion (i.e. C^*_{jk}, the acquisition cost less residual value) and the expected activity duration (i.e. D^*_{jk}, the estimated useful life). The second part of the right-hand side of expression (3) 'writes back' accumulated depreciation charged over the entire lifetime of the 'fixed asset' up to the start of the accounting period ($i = t$-1-S_{jk}) on all $j = N_k^c$ long-term activities of class k finishing during the accounting period. The effect of (3) is to shift accounting earnings from one accounting period to another, which is what gives depreciation the potential to 'smooth' earnings around long-term profitability.

The estimated arguments of the depreciation function, C^*_{jk} and D^*_{jk}, are each modelled over three different expectations regimes, reflecting three different levels of ability of the accountant to estimate residual values and useful lives in calculating the depreciation adjustment. These regimes are referred to as random expectations, rational expectations, and accurate expectations, similar to the usage in Willett (1991b).[6] In the case of *random expectations*, the accountant is assumed to guess rather haphazardly at residual values and useful lives so that, for each realised activity, C^*_{jk} and D^*_{jk} are randomly sampled from the distributions generating C_k and D_k respectively. In the case of *rational expectations*, the accountant is assumed to have knowledge of the expected values of the distributions generating residual values and useful lives and to use these in the calculation of depreciation, so that $C^*_{jk} = E(C_k)$ and $D^*_{jk} = E(D_k)$. In the case of *accurate expectations*, the accountant is assumed to have accurate foresight of activity residual values and useful lives. Thus in that case, $C^*_{jk} = c_{jk}$ and $D^*_{jk} = d_{jk}$. the actual, realised values of these two respective random variables.

The only form of the depreciation function considered in this paper is the standard, linear ('straight-line') depreciation adjustment, which is, once the activity begins,

$$f_k = C^*_{jk} / D^*_{jk} \mid t - \lfloor s_{jk} \rfloor \leq D^*_{jk} \qquad (4)$$

and zero otherwise. This form appears to capture most of the benefit, in terms of the reduction of the variance of earnings around long-term profitability, from the application of a depreciation adjustment (see Lane and Willett, 1997). In the body of the paper, the references *depreciated earnings-random*, *depreciated earnings-rational* and *depreciated earnings-accurate* are used to denote an earnings calculation that includes the component DA defined in expression (3) under random, rational and accurate expectations regimes respectively.

As noted at the end of the last section, in the models examined in this paper all economic variables are stationary.[7] For start times, the homogeneous (stationary) Poisson process is adopted. This process is widely employed in modelling constant rate arrival processes in queuing theory.[8] For modelling activity duration times, the lognormal distribution is adopted. The lognormal provides ease of parameter manipulation and conforms to intuition on plausible distributions of duration times. For costs (expenses and revenues), the uniform distribution is adopted as the form of the distribution. In the absence of empirical evidence, it is difficult to justify the particular merits of any distribution over others in terms of representativeness of activity costs in practice. The uniform distribution represents a kind of minimum information scenario distribution for costs.[9]

The basic experimental design has three dimensions. The first dimension represents the accountant's choice of earnings function. The choices are between four versions of earnings – one without depreciation (*undepreciated earnings*), and three with a depreciation adjustment added (*depreciated earnings*) across the three alternate expectations regimes described above (random, rational and accurate). Unlike the depreciated forms of earnings, undepreciated earnings consist of just the *UE* component of expression (2).[1] All four alternative earnings calculations are generated in each experiment from a common set of simulated activity costs, start times and duration times. Choice of earnings function is the key dimension in the experiments, the objective being to study its influence on the periodic earnings figures reported in different accounting periods.

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[6] The 'accurate' expectations regime is equivalent to the 'perfect' expectations regime in that paper.

[7] In a sequel, the restriction to stationarity is dropped.

[8] Law and Kelton (1991:404–406).

[9] Thomas Bayes, proposed the uniform distribution as the prior distribution for his famous theorem, and it is sometimes justified by Bernoulli's principle of insufficient reason.

The second dimension of the experimental design reflects the level of activity of the firm's economic processes. The activity level is reflected in the mean of the activity start times per accounting period or *start rate*, which plays a role analogous to the sample size in the asymptotic analysis of statistical theory. The higher the start rate, the greater is the number of activities that are either ongoing or completed in each accounting period, on average. In the models considered here, the different means for the distribution of duration times simply shift the completion date of activities within the experimental time horizon but leave the overall activity level unchanged. Thus, the start rate is overwhelmingly the main determinant of the activity level. In this context, the start rate may intuitively be thought of as being caused by market demand factors. Greater demand implies a higher start rate for activities. In contrast, the duration time of activities may be thought of as being caused by relatively stable, longer term supply factors such as existing technologies and the availability of materials and labour. As will be seen later, the distributional form of earnings depends crucially on the activity level.

The third dimension of the experimental design is the cost structure parameter. This is represented in the experiments reported below by the ratio of the means of the activity expenses and revenues and is referred to as the *cost ratio*. Cost ratios are selected to reflect varying relative acquisition and residual values of different types of asset, for example, tangible fixed assets; expenses and revenues associated with investments in intangibles; and expenses and revenues incurred in long-term contracts.

The central questions regarding the start rate and cost ratios, i.e., the second and third dimensions of the experimental design, are their influence on convergence in the form of the earnings distribution and their role in differentiating the various distributions resulting under each expectations regime (i.e., the first dimension of the experimental design) at realistic activity levels (start rates). Each experiment reported below is thus identified by a unique set of parameter levels or 'specifications' across each of the three dimensions. In Sections 7 and 8 below, a *specification* Sx, where x is an integer, is an experimental setting defined by parameters for the start rate, the distributions defining the cost ratio and the distribution generating duration times. The output from each specification is 10,000 observations of the value of accounting earnings for each of the four expectations regimes.

6. Analyses of samples

The primary approach to evaluating the distributions of earnings samples generated by the experiments just described is graphical. Two kinds of graph are used, a histogram of the frequency of the experimentally generated earnings numbers and a 'distribution' function showing the same frequencies cumulated. On both are superimposed equivalent graphs for a calibrated, normally distributed variable, where the latter's distributional parameters are set equal to the respective, experimental parameter values. The graphical methods are supported by the coefficients of skewness and kurtosis, allowing an indicative comparison with the normal in terms of symmetry and tailedness respectively.[10,11]

For the evaluation of convergence to the Gaussian distribution, two empirical distribution function (EDF) goodness of fit statistics are computed (where possible) to support testing against the equivalent normal distribution. The main test employed is the Anderson-Darling (A-D) statistic. The A-D test generally has high power relative to alternative tests, especially where the true and hypothesised distributions differ primarily in the tails and where the parameters of the hypothesised distribution are estimated from the sample (Stephens, 1986). Critical values for the A-D test in the all-parameters-estimated-case are 1.03 at the 0.01 significance level and 0.75 at the 0.05 significance level. Similar respective critical values for the Kolmogorov-Smirnov (K-S) goodness of fit test statistic are 1.04 and 0.90 (Stephens, 1986; Law and Kelton, 1991).

7. Results: limiting form

Results dealing with the question of a limiting form of earnings distribution are considered first. The approach adopted is to set distributions to determine the cost ratio and activity duration and then run experiments with successively increasing start rates. Frequency and distribution comparisons and summary statistics are generated and scrutinised for each expectation regime. If a sample distribution appears to approach the normal form, then the A-D and K-S tests are invoked to

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[10] Statements concerning the summary statistics, are indicative only, i.e. they are not statements regarding statistical significance. See Lewis and Orav (1989:119–124).

[11] Variance statistics are not an explicit focus of the paper but their behaviour in the experiments is consistent with results reported in previous studies.

Table 1
Specifications: limiting form

	Parameter			
Specification	*Start rate (Activity level)*	*Expenses*	*Revenue*	*Duration*
S1	10	U[8.268, 11.732)	U[3.268, 6.732)	LN(lm=5, lv=1)
S2	100	"	"	"
S3	1000	"	"	"
S4	10	"	U[− 0.732, 2.732)	"
S5	100	"	"	"
S6	10	"	U[8.268, 11.732)	"

Note: S*x*, $x = 1$ to 6, are the labels (specifications) for the experiments based on the start rates, and parameters of the cost and duration distributions shown in the same rows of the Table.
U[a,b) denotes the uniform distribution with lower bound = a and upper bound < b. LN(lm=5, lv=1) denotes the lognormal distribution with a mean of 5 accounting periods and a variance of 1 accounting period.
The mean and variance of the uniform distribution for expenses in these experiments are computed as:

$$\frac{(8.268 + 11.732)}{2} = 10 \text{ and } \frac{(11.732 - 8.268)^2}{12} = 1,$$

respectively. The corresponding mean and variance for the revenue distributions can be calculated in similar fashion. In the case of S1 these are 5 and 1 respectively. The cost ratio is the ratio of the means of the expense and revenue distributions. Thus the cost ratio in S1 is 10/5 = 2.

test for goodness of fit to the normal.

The various experimental specifications are defined by the rows in Table 1. The first column lists the specification reference (S*x*). The other columns of the Table show the related start rate (activity level – column 2) parameters of the distributions of expenses and revenues (columns 3 and 4 respectively) and parameters of the distribution of duration times (column 5).

Consider first a series of specifications, S1 – S3, typical for a fixed asset activity class. The average residual value is one-half of the acquisition value and the average useful life is five periods. Expenses (acquisition costs in the fixed asset interpretation) are uniformly distributed with mean 10 and variance 1. Revenue (residual value in the above interpretation) is also uniformly distributed with mean 5 and variance 1. The means of the expenses and revenue imply a cost ratio of 2. These specifications are set out in the first three rows of Table 1 based upon start rates of 10, 100 and 1 000 activities.[12] Thus, specification S1 is based on a start rate of 10 activities, draws expenses from a uniform distribution lying between the values of \$8.268 and \$11.732, revenues from a uniform distribution lying between \$3.268 and \$6.732, with activity duration times generated by a lognormal distribution having a mean of 5 accounting periods and a variance (and standard deviation) of one accounting period.

With the start rate set at 10 (S1), the frequency comparisons (Appendix, Figures 1 and 2) indicate moderate divergence from the respective equivalent normal distribution, with a surplus in the lower middle range up to the mode and, symmetrically, a deficit in the upper middle range.[13] This moderate asymmetry, with relatively long upper tails, is reflected in the positive skewness statistics for earnings under each expectations regime (see Table 2). The kurtosis statistics (see Table 3) indicate possible positive kurtosis for both undepreciated and depreciated earnings. However, skewness and kurtosis are ameliorated somewhat by depreciation and variance is reduced about three-fold, consistent with previous findings. The A-D test statistics (see Table 4) nevertheless signal rejection of normality for earnings in the cases tested.

What is most striking about these results is the quite mild divergence from normality. Earnings generated from a class of activities with start times averaging 10 per period assume a quasi-normal form. The normal may in consequence be a useful approximation, for practical purposes, in relation to sets of activities of similar scale. At this lower scale of activities, depreciation has only a minimal

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[12] The notation for the durations reflects the actual mean and variance of the lognormal, rather than as per standard practice, the mean and variance of the underlying normal from which the former distribution is derived.

[13] For the sake of brevity, for most experiments on the limiting form, only results for undepreciated earnings and depreciated earnings under a single expectations-regime are reported. In most cases the regime is rational expectations, i.e. depreciated earnings-rational. Very little is lost by this as is demonstrated with certain specifications where complete sets of results over all settings of control variables are provided.

Table 2
Coefficients of skewness

	Expectations regime			
Specification	*Undepreciated earnings*	*Depreciated earnings (random expectations)*	*Depreciated earnings (rational expectations)*	*Depreciated earnings (accurate expectations)*
S1	0.35	0.21	0.21	0.24
S2	0.11	0.09	0.07	0.09
S3	0.05	0.04	0.02	0.04
S4	0.35	0.23	0.22	0.21
S5	0.10	–	0.10	–
S6	0.00	–	–	0.00

Note: The experimental specifications Sx, $x = 1$ to 6, are defined in the Note to Table 1.

The different expectations regimes define different calculations of accounting earnings. No depreciation is applied in the case of undepreciated earnings. In the case of the other three regimes a depreciation-type adjustment is applied to earnings. Under *random expectations* the estimated residual values and estimated useful lives that are used to compute depreciation are randomly drawn from the same distribution that generates the actual residual values and useful lives of the activity concerned. *Rational expectations* computes depreciation using the expected values for the residual values and useful lives distributions from which the actual values are sampled. Under *accurate expectations* the actually realised residual values and useful lives of the relevant activity are assumed to be known and used in the depreciation calculation.

Skewness is defined as

$$\frac{n}{(n-1)(n-2)}\sum_{i}\left(\frac{x_i-\bar{x}}{s}\right)^3$$

where s is the standard deviation. Positive skewness indicates a distribution skewed to the right with a tail extending towards higher positive values.

Table 3
Coefficients of kurtosis

	Expectations regime			
Specification	*Undepreciated earnings*	*Depreciated earnings (random expectations)*	*Depreciated earnings (rational expectations)*	*Depreciated earnings (accurate expectations)*
S1	0.16	0.17	0.09	0.09
S2	-0.06	0.01	-0.06	-0.07
S3	-0.02	0.03	0.03	-0.03
S4	0.11	0.01	-0.07	-0.01
S5	0.05	–	-0.04	–
S6	0.29	–	–	0.01

Note: The specifications Sx, $x = 1$ to 6, are defined in the Note to Table 1. The expectations regimes are defined in the Note to Table 2.

Kurtosis is defined as

$$\left(\frac{n(n+1)}{(n-1)(n-2)(n-3)}\sum_{i}\left(\frac{x_i-\bar{x}}{s}\right)^4\right)-\frac{3(n-1)^2}{(n-2)(n-3)}$$

where s is the standard deviation. Under this form of measure for kurtosis, a normally distributed variable is expected to have a value of zero. Negative values indicate a relatively flat distribution. Positive values indicate a relatively peaked distribution.

Table 4
EDF statistics: Anderson-Darling (A-D); Kolmogorov-Smirnov (K-S)

Specification	*Expectations regime* *Undepreciated earnings*	*Depreciated earnings (random expectations)*	*Depreciated earnings (rational expectations)*	*Depreciated earnings (accurate expectations)*
S1	12.26; NA	–	6.25; NA	–
S2	1.89; NA	–	1.01; NA	–
S3	0.55; 0.79	0.24; 0.61	0.22; NA	0.31; NA
S4	17.01; NA	7.29; NA	6.93; NA	6.03; NA
S5	1.17; NA	–	1.70; NA	–
S6	1.30; NA	–	–	0.24; NA

Note: The specifications Sx, x = 1 to 6, are defined in the Note to Table 1. The expectations regimes are defined in the Note to Table 2.
The decision rules for the Anderson-Darling goodness of fit test are: Reject normality if A-D > 1.03 at a 0.01 level of significance; Reject normality if A-D > 0.75 at a 0.05 level of significance.
The decision rules for the Kolmogorov-Smirnov goodness of fit test are: Reject normality if K-S > 1.04 at a 0.01 level of significance; Reject normality if K-S > 0.90 at a 0.05 level of significance.

effect on the form of the earnings distribution – although addition of a depreciation adjustment apparently does transform the earnings form slightly towards normality.

With the start rate set at 100 (S2), the frequency comparisons (Appendix, Figures 3 and 4) indicate closer correspondence to the calibrated normal. The distribution function comparisons to the normal (Figures 5 and 6) indicate only small divergence, with lower numbers of observations being contained in the tails. The A-D test value still indicates rejection of normality for undepreciated earnings at the 0.01 significance level (Table 4). However, normality for depreciated earnings is not similarly rejected. On the evidence to this point, depreciated earnings might be regarded as possessing essentially normal form at start rates of upwards of 100 per period.

The start rate is increased to 1 000 in S3. The skewness and kurtosis statistics are uniformly negligible for both undepreciated and depreciated varieties of earnings. The A-D test values indicate non-rejection of normality at the 0.05 significance level for all four samples (Table 4).

The results to this point are consistent with asymptotic normality. Convergence is incomplete at finite levels of the start rate so it may be expected that given a sufficiently powerful test, some samples will randomly deviate, sufficient to incur rejection. The A-D test has high power, with the capability of detecting extremely small discrepancies from the hypothesised distribution. Occasional findings of non-normality therefore do not disturb the conclusion that the true distribution is approximately normal in the limit with respect to the start rate.

Comparison of the empirical distributions for undepreciated and depreciated earnings (e.g. under rational expectations) with alternative forms such as Gamma and Beta further support this conclusion. Under S1 and S2, suitably parameterised forms of either the Gamma or Beta distributions (or both) provide closer fits to the sample data. Under the conditions of S3, however, this is no longer the case. The normal distribution provides a better fit than both the Gamma and Beta distributions, based on the A-D statistic.

That the convergence slows may be appreciated by inspection of the frequency comparisons for S3 (Figures 7 and 9). Despite the 10-fold increase in the start rate compared to S2, the improvement in fit to the normal is difficult to discern visually from the histograms.[14] Some evidence of convergence is, however, discernable in the tails of the sampling distributions (i.e., compare Figures 5 and 6 with Figures 8 and 10). The skewness and kurtosis statistics also diminish consistently across expectations regimes (Tables 2 and 3).

On this evidence, the start rate or level of activity drives convergence to normality. The influence of the cost ratio is also modelled to determine if the rate of convergence is additionally dependent on this variable (see Table 1, lower three rows). Alternative cost ratios, 10 (S4, S5) and 1 (S6) are selected to evaluate the existence of any advancement or retardation of convergence relative to the distributions at identical activity levels under a cost ratio of 2 (as in S1, S2 and S3).

The S4 and S5 specifications may be interpreted as corresponding to a fixed asset activity involving the acquisition, holding and ultimate disposal of some item of equipment where the residual value is relatively minor in comparison with the acquisition value. The overall results both for undepreciated earnings and for depreciated earnings-rational give little indication of a greater divergence from normality for S4 and S5 than those of S1 and S2 respectively.[15] Inspection of the comparative divergence from normality across the earnings calculations also indicates very minor differences. This shows the marginal influence of depreciation and the very slight differences induced by alternative settings of estimates of the expectations-regime variables. Two implications follow. The first implication is that differences in convergence are relatively minor as between the various versions of earnings, despite a high cost ratio. The second implication is that, when considering forms of convergence, little information is lost in confining attention to one version only of depreciated earnings.

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[14] Note again the threefold decrease in the variance of depreciated earnings compared to undepreciated earnings.

The S6 specification, with a cost ratio of unity, may be taken to represent a fixed asset activity with high relative average residual value or a negligibly profitable long-term contribution project. The skewness statistics are zero, although the relevant kurtosis statistic does indicate possible positive kurtosis in the case of undepreciated earnings. The A-D test indicates rejection of normality at the 0.01 significance level for undepreciated earnings but non-rejection at the 0.05 level for depreciated earnings-accurate.[16,17]

Perhaps the most striking aspect of the S6 result is that normality is inferred at a start rate (activity level) of 10 activities per period. The result indicates that the cost ratio can be critical to the rate of convergence of the earnings distributions. If the cost ratio is approximately unity, effective convergence to normality occurs at a start rate of a factor of 10 less than that occurring where the cost ratio differs substantially from unity.

Summarising, the limiting form experimental results indicate that undepreciated and depreciated earnings distributions converge to approximate normal form with respect to the start rate.[18] The range of values of the start rate at which inference of normality is likely is only minimally influenced by the addition of a depreciation adjustment.

The implications of the above results have to be viewed from the standpoint of the realism of the assumptions. From the experiments, under the stated assumptions, earnings distributions appear quasi-normal in the sense of being unimodal, near bell-shaped and having only minimal levels of skewness and kurtosis. This pattern arises at an order of about 10 start times per accounting period, i.e. at relatively low activity levels. Apart from the special case of near-unity, convergence is not sensitive to the cost ratio. Sets of large numbers of homogeneous activities in theory generate a normal limiting distribution of instantaneous earnings, approximated by earnings being conditioned on an accounting period (Willett, 1991). However, in the context being examined here, it is the marginal distribution of earnings over time that is of interest, i.e. the ability of accounting period earnings to estimate longer term average profit. The tendency to normality then depends upon the pattern of start times and duration times.

The results of the simulation experiments do not prove convergence of the marginal distribution of earnings to normality as activity levels increase. Undepreciated earnings, as with most accounting numbers, is a random sum of random variables. It is easy to find examples of random sums that are not normally distributed. For example, whatever the distribution of the individual elements in a random sum, if the distribution generating the length of the random sum follows a simple Bernoulli law, the resulting density of the random sum will be bimodal, with the sums falling into two distinct ranges. However, it is also true that in those many cases where certain regularity conditions are satisfied, such as where independent and identically distributed activity start times are generated by a stationary Poisson process and duration times by an exponential law, undepreciated earnings converge to the normal distribution as activity levels increase (by an application of theorem 4 in Feller, 1971:265). It has not been proved here that the same regularity conditions on the behaviour of the generating process that guarantee convergence in the Poisson-exponential case also applies in the Poisson-lognormal case assumed in the simulation experiments. Furthermore, the convergent-to-normality theorems are relevant only to the undepreciated earnings formulation in (2), not the depreciated earnings formulation in (3) and the limiting behaviour of expressions of the latter type

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[15] The graphical analyses for S4, S5 and S6 are not presented due to limitations of space and the similarity to the earlier results.

[16] The form of depreciated earnings presented here is that under accurate expectations. This is due to the form generally presented in these analyses (under rational expectations) resulting in an identical distribution of the sample as that of undepreciated earnings. The reason is that as the expected activity cost is zero, the assignment of depreciation adjustments to periods is null.

[17] Graphical analyses are not presented for the S6 or S7 distributions due to the extremely close correspondence to normality and similarity to previous presentations.

[18] It appears unwise to assert any stronger claim than this at the present stage. A statement of normality in the limit may invoke difficulties with infinite variances, i.e., reasoning in the central limit theorem context depends on the fact that the standard deviation approaches infinity of an order less than the sample size; however no averaging of the sample is involved in earnings.

Table 5
Specifications: Non-limiting forms

Specification	*Parameter*			
	Start rate (Activity level)	*Expenses*	*Revenue*	*Duration*
S7	0.5	U[8.268, 11.732)	U[7.268, 10.732)	LN(lm=5, lv=1)
S8	2	"	"	"
S9	0.5	"	U[− 0.732, 2.732)	"
S10	2	"	"	"
S11	1	"	U[3.268, 6.732)	"
S12	"	U[9.452, 10.548)	U[4.452, 5.548)	"
S13	"	U[8.268, 11.732)	U[3.268, 6.732)	LN(lm=10, lv=1)
S14	"	"	"	LN(lm=10, lv=4)

Note: Sx, $x = 7$ to 14, are the labels (specifications) for the experiments based on the start rates, and parameters of the cost and duration distributions shown in the same rows of the Table.
A start rate of 0.5 implies that, on average, one activity begins every two accounting periods.
U[a,b) denotes the uniform distribution with lower bound = a and upper bound < b. LN(lm=c, lv=d) denotes the lognormal distribution with a mean of c accounting periods and a variance of d accounting periods. The values of the means and variances of the uniform cost distributions and the value of the cost ratios can be checked by following the calculations in the Note to Table 1.

is not known analytically. Nevertheless, the simulation results reported in this section provide experimental evidence that suggests the different versions of earnings in the independent and identically distributed Poisson-lognormal case do more closely approximate the normal distribution as activity levels (measured by the start rate variable) increase.

This conjecture, however, depends upon two important conditions. One is that the activity level is relatively high, higher perhaps than in many fixed asset processes. The other is that, expectations concerning residual values and expected useful lives of assets are accurate. Failure of either condition can lead to the normal distribution not being a good approximation (or such a good approximation) for both undepreciated and depreciated earnings. The small sample behaviour of earnings is examined in the next section. The effect of inaccurate expectations is examined in Section 9, in the context of fixed asset impairment.

8. Results: non-limiting forms

The modelling of non-limiting forms of earnings distributions is now considered. The basic experiments have a simple 2x2x4 design with two levels of the start rate (activity level) two cost ratios and the four different earnings calculations. This simple design is sufficient to convey the basic depreciation-related properties of earnings statistics in quite realistic circumstances (see Table 5). Graphical comparisons of frequency and distribution functions and summary statistics reveal, firstly, the properties of undepreciated earnings, secondly, the general influence of the depreciation adjustment and thirdly, the specific impact of the alternative levels of accuracy of the estimates of activity costs and durations required as inputs to the depreciation function.

Consider first specifications S7 and S8. The cost ratio, 10/9, is representative of long-term contracts with profit allocation or of fixed assets for which very high relative residual values prevail. For S7, the frequency comparison for undepreciated earnings (Figure 11) has a spike at the mode and long tails, reflecting gross divergence from normality. Apart from the spike, a substantial element of symmetry exists. The summary statistics suggest positive skew (see Table 6) and substantial kurtosis (see Table 7). The depreciated earnings frequency comparisons reveal relatively modest transformations of earnings under depreciated earnings-random and depreciated earnings-rational (Figures 12 and 13 respectively) and more substantial transformation under depreciated earnings-accurate (Figure 14). Consolidation around or near the mode of the equivalent, calibrated normal distribution can be observed for the three varieties of depreciated earnings. For the depreciated earnings distributions, diminished differences from normality are clarified by the distribution comparisons (Figure 15 versus Figures 16, 17 and 18 respectively). Overall however, the depreciation adjustment leaves the distributions well short of quasi-normality. This is due to heavy upper tails and excess density about or just short of the mean of the equivalent normal. This feature varies considerably across expectations-regimes.

For S8, undepreciated earnings are modestly symmetric, apart from the spike at the mode

Table 6
Coefficients of skewness

	Expectations regime			
Specification	*Undepreciated earnings*	*Depreciated earnings (random expectations)*	*Depreciated earnings (rational expectations)*	*Depreciated earnings (accurate expectations)*
S7	1.91	0.43	0.53	1.22
S8	0.93	0.27	0.33	0.55
S9	1.47	1.06	1.07	1.06
S10	0.75	0.50	0.47	0.38
S11	1.12	0.68	0.71	0.66
S12	1.01	0.73	0.67	0.65
S13	1.09	0.77	0.76	0.71

Note: The experimental specifications S*x*, *x* = 7 to 13, are defined in the Note to Table 5.
The different expectations regimes are defined in the Note to Table 2.
The skewness statistics are defined and interpreted in the way described in the Note to Table 2.

Table 7
Coefficients of kurtosis

	Expectations regime			
Specification	*Undepreciated earnings*	*Depreciated earnings (random expectations)*	*Depreciated earnings (rational expectations)*	*Depreciated earnings (accurate expectations)*
S7	5.20	3.98	4.17	2.47
S8	0.93	0.27	0.33	0.55
S9	2.31	1.52	1.74	2.07
S10	0.76	0.30	0.22	0.09
S11	1.31	0.78	0.88	0.51
S12	1.05	0.61	0.50	0.55
S13	1.21	1.28	1.10	0.69

Note: The experimental specifications S*x*, *x* = 7 to 13, are defined in the Note to Table 5.
The different expectations regimes are defined in the Note to Table 2.
The kurtosis statistics are defined and interpreted in the way described in the Note to Table 3.

(Figure 19). The depreciated earnings distributions reflect substantial transformations of earnings – the spike is eliminated and the mass of each distribution is fairly closely concentrated about or near the mode of the respective calibrated normal, as may be seen from the frequency comparisons (Figures 20, 21 and 22). The overall strength of the transformation is confirmed by the distribution comparisons (Figure 23 versus Figures 24, 25 and 26). The summary statistics suggest a considerably lower level of skew and tailedness in comparison to the comparable S7 distributions. Substantial differences from normality are revealed by the frequency and distribution comparisons – again, principally excess density in the upper tails and about or slightly below the mean. However, distributions are less well differentiated than in the case of S7. At this low-moderate, realistic range of the start rate, the impact of scale is strong, and its interaction with depreciation unambiguous in driving earnings distributions towards a broadly consistent form (S8 versus S7, i.e. Figures 20, 21 and 22 versus Figures 12, 13 and 14).

S9 and S10, with a cost ratio of 10, represent sets of fixed or intangible assets where, in comparison to the acquisition expense or expenditure program, the respective residual values or related revenues are quite modest. For S9, the frequency comparison (Figure 27) indicates that the distribution of undepreciated earnings has a severe spike at zero and at least two further modes, is extremely asymmetric, with high positive skew and a long upper tail. The distribution comparison (Figure 31) indicates clearly the overall differences from the equivalent normal distribution. The substantial impact of the greater cost ratio is evident by comparing S9 with S7 (Figure 27 and Figure 11 respectively).

Depreciation results in a radical transformation in each case for S9. All depreciated earnings distributions display substantial consolidation for earnings – as indicated by the frequency comparisons (Figures 28, 29 and 30). While the consolidation takes multi-modal forms, particularly with depreciated earnings-rational, all depreciated earnings distributions are far more symmetric and have shorter tails than the undepreciated earnings distribution, features reflected in the skewness and kurtosis statistics. The depreciated earnings distributions, however, display strong, variegated divergence from their normal equivalents. High multi-modality of the distribution under depreciated earnings-rational is the most striking feature, with excess density widely distributed about the mean, revealed most clearly by the distribution comparison (Figure 33). The distributions under depreciated earnings-random and depreciated earnings-accurate are both less divergent from the normal and demonstrate some similarities, especially on the evidence of the distribution comparisons (Figures 32 and 34), with excess density somewhat short of the mean and heavy upper tails. Comparison of the depreciated earnings distributions with those of S7, for instance Figure 29 with Figure 13, reveals that at a low start rate, the differential influence of the cost ratio remains strong, despite the depreciation adjustment tending to transform earnings towards a consistent general form.

For S10, the undepreciated earnings distribution is extremely multi-modal, highly asymmetric, and has a long upper tail, as indicated by the frequency comparison (Figure 35). Strong divergence from normality is clear from the frequency comparison, and from the distribution comparison (Figure 39). The cost ratio well-differentiates the undepreciated earnings distributions, as evidenced by comparison with S8 (Figure 35 versus Figure 19).

Depreciation again radically transforms the earnings distribution. Depreciated earnings distributions are very substantially consolidated, being unimodal and featuring higher symmetry, as indicated by the frequency comparisons (Figures 36, 37 and 38). Under all expectations-regimes, the depreciated earnings distributions display relatively limited and consistent divergence from the respective normal equivalents – excess density slightly below the mean and heavy upper tails – as per the distribution comparisons (Figures 40, 41 and 42). Detectable differences remain in the depreciated earnings distributions across the cost ratios, as evidenced by a comparison with S8 via, for instance, Figure 37 versus Figure 21. However, across the parameter levels evaluated, variation in the start rate or activity level appears to have a stronger impact than variation in the cost ratio (S10 versus S9 via for instance Figure 37 versus Figure 29).

At this point, a question of generality arises – how robust are the non-limiting results and do settings of other parameters have a significant influence? S11 and subsequent specifications allow these issues to be explored. S11 is the base specification for comparison with the further higher-indexed specifications. For S11, the undepreciated earnings distribution has a now-familiar form, being highly asymmetric with heavy upper tail, a spike at zero, multi-modal, and grossly different from the normal, as seen from the frequency comparison (Figure 43) and distribution comparison (Figure 47). The impact of depreciation is striking. Accurate rather than random expectations improve the approximation to quasi-normality (frequency comparisons, Figures 44 and 46 respectively and distribution comparisons, Figures 48 and 50 respectively). Depreciated earnings-rational however are far from quasi-normal, due to their multi-modality (Figure 45) and generally irregular behaviour *vis-à-vis* the calibrated normal form (Figure 49).

In the first form of parametric variation, S12 models the influence of the activity cost variances, with these reduced by a factor of 10 and all other parameter settings identical. The expense and revenue variances have a radical influence over the form of the undepreciated earnings distribution. It is highly multi-modal and differs very substantially from the base undepreciated earnings, essentially by way of the density being concentrated in a series of largely discrete spikes. This feature is revealed in the frequency comparison (Figure 51, compare with Figure 43). It may be concluded that the cost variance is an influential factor for the undepreciated earnings distributions. Yet, the situation with the depreciated earnings distributions is somewhat different. The depreciated earnings distribution forms correspond more closely to the respective base distributions. This is evident from the frequency comparisons, for instance depreciated earnings-accurate (Figure 54) and the comparable base distribution (Figure 46) though there is greater divergence from a normal form in the former (Figures 58 and 50 respectively).

The result for the activity cost variances modifies the earlier findings on the non-limiting distributions. Such variation, where it is influential, is reflected in the undepreciated earnings distributions and in the corresponding depreciated earnings distributions in the case of a parameter such as the cost ratio. However, this pattern is not reflected with the cost variances. The latter parameter, while influential with respect to undepreciated earnings, is largely overridden by the depreciation adjustment. The earlier statement must in consequence be modified in the sense that there are forms of parametric variation where the depreciation adjustment dominates such variation. From a preparer or user point of view, in such circumstances parametric variation is significant only where a 'no depreciation' policy is adopted.

The second and third forms of parametric variation involve the durations. In S13 the influence of the duration mean is modelled via the adoption of a value twice that of the base model. The undepreciated earnings distribution is similar to that of the base, as seen from the frequency comparison (Figures 59, compare with Figure 43) and distribution comparison (Figure 63, compare with Figure 47). However, the depreciated earnings distributions display more substantial differences from the respective base distributions. The differences are most noticeable for depreciated earnings-accurate, with the S13 distributions being less close to a normal form (see the histograms in Figures 62 and 46 and the distribution comparisons in Figures 66 and 50).

The pattern of influence of the duration mean stands in direct contrast to that of the activity cost variance. S13 indicates that there are parameters significantly influencing only the depreciation-adjusted earnings distributions. Finally, in S14, the duration variance is set at four times that of the base. The resulting distributions are essentially indistinguishable from the base so it is concluded that the variance of the durations is of minimal influence.[19]

Summarising, the non-limiting form results indicate two properties of the depreciation adjustment impact on earnings. First, at modest, realistic activity levels measured by the start rate, adding a depreciation adjustment induces a profound change in the form of the earnings distribution. This change reflects a radically accelerated transformation towards a consistent form, usually closer to the normal, which otherwise arises only as a function of the start rate. Second, economic parameters condition the nature of depreciation's impact. One parameter, the cost ratio, exerts comprehensive, consistent influence over the depreciated earnings distributions, essentially by way of modifying the starting point, the undepreciated earnings distribution, from which the transformation arises. The conditioning pattern of other parameters is complex. In some cases, the conditioning is ineffective in the sense that the undepreciated earnings and depreciated earnings distributions are unchanged. In other cases, conditioning is effective in the sense that the transformation to depreciated earnings differs, despite an essentially common undepreciated earnings starting point, or conversely, the transformation is similar, despite a very different starting point.

The non-limiting form of depreciated earnings, while closer to the normal in appearance than corresponding undepreciated earnings distributions, is skewed to the right and exhibits positive kurtosis. The question of whether a particular theoretical, non-normal probability law might fit the skewed experimental data better than the normal law is considered further towards the end of the next section.

9. Fixed asset impairment

Accounting standards such as International Accounting Standard 36 *Impairment of Assets* (IASB, 2004) require fixed assets to be written down to 'recoverable amounts' if these are lower than book value (carrying amount) and for depreciation from that point to be calculated on the basis of the revised amounts. This section of the paper considers the effect that applying the impairment provisions has on the distribution of earnings for the relatively low start rates (activity levels) at which depreciation has a noticeable impact on shape. Two main cases are considered: (i) the original estimates of residual values are revised downwards at some point before the end of the useful life of the asset, so that the recoverable amount of the asset, calculated on a straight line basis is less than its book value; and (ii) the original estimates of residual value and useful life do not alter but it is nevertheless decided, for whatever reason, that the recoverable amount is less than book value and impairment adjustments are made. Case (i) entails a revision of estimates to reflect specific, changed expectations of a real economic event that is an explicit part of the depreciation calculation. Case (ii) relates to those situations where more general, subjective judgments are used to justify an impairment, such as where a reduction in asset value is considered necessary to reflect how the perceived benefits of an asset are attributable to its being 'used up', usually in the absence of any unambiguous, objective evidence to support the contention. This case covers a type of adjustment described by Thomas (1969; 1974) as being arbitrary.

Case (i): Statistical estimates of residual values change.

Willett (1991b) showed analytically in a simple case how mistakes in estimating the useful lives of fixed assets increase the variance of earnings. Mistakes in estimates of residual values have a similar impact, and also tend to increase skewness and kurtosis. However, not correcting for such mistakes when they are first discovered can lead to still larger increases in the variance, skewness and kurtosis of the distribution of earnings. These effects are shown in the results of experiments S11A and S11B.

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[19] And therefore the graphics are not displayed.

Table 8
Statistics for earnings distributions under conditions of impairment

	Specification			
Statistic	*S11*	*S11A*	*S11B*	*S11C*
Variance	6.52	28.41	39.06	8.35
Skewness	0.66	0.75	0.89	1.15
Kurtosis	0.51	3.63	3.85	2.28

Note: Experimental specification S11 is defined in Table 5. The remaining specifications are the same as S11 except for the following:

S11A: Residual value falls to zero halfway through the life of the activity and the impairment provisions are applied at that time.

S11B: Residual value falls to zero halfway through the life of the activity but the impairment provisions are not applied. The change in residual value is recognised on completion of the activity (i.e. the end of the asset's useful life).

S11C: Neither the residual value nor the useful life of the activity (asset) changes. However, the net book value of the asset is written down by 50% to its supposed recoverable amount in two periods out of ten, on average. The skewness and kurtosis statistics are as defined in the Notes to Tables 2 and 3 respectively.

Experiment S11A models the same activity-class generating process defined in S11 excepting that, halfway through the asset's lifetime, estimates of final, expected residual values are revised down to zero and, when this occurs, the impairment provisions are applied. Experiment S11B repeats this scenario, with the difference that the impairment provisions are not applied and depreciation continues to be charged at the same rate as prior to the revision of estimates, through to the end of the useful life of the asset. This experiment models the 'traditional' situation whereby profits and losses on disposal, due to inaccurate estimates of residual values and useful lives, are recognised in the income statement at the end of an asset's useful life. Histograms of depreciated earnings for these two experiments are shown in Figures 67 and 68, which can be compared to those for S11 shown in Figure 46. The variance, skewness and kurtosis statistics (see Table 8) have increased in S11A and again further (when impairment is not recognised) in S11B. However, the histogram result for S11 can no longer be realised, and is in fact biased, under the changed economic circumstances. Only the histograms in S11A and S11B are realisable under the new circumstances and the variance, skewness and kurtosis statistics are all less in S11A than in S11B. Consequently, the inference is that if impairment of an asset occurs, due to estimates of realisable values being revised to reflect a more accurate state of affairs, recognising the impairment immediately the new information is received (i.e. as recommended by current accounting standards) produces a form for the distribution of earnings more closely approximating the normal than would be the case if the impairment event was ignored until the final disposal of the asset.

Case (ii) Neither estimates of residual values nor useful lives change but an impairment event is nevertheless recognised.

Experiment S11C models the same situation as S11 except that on average, in two periods out of ten, the impairment provisions are applied and book value is reduced by 50% to its supposed recoverable amount at that time. The estimates of residual values and useful lives, however, remain unchanged. The only thing that changes is the time pattern of the recognition of costs over the asset lifetime. The consequences of this treatment are shown by comparing the histogram in Figure 46 with the histogram in Figure 69. Both histograms are centred on an unbiased mean but the variance, skewness and kurtosis of the distribution of earnings in the impairment case are higher than under the original treatment of depreciation (see Table 8). Unlike Case (i) however, in Case (ii) the histogram shown in Figure 46 continues to be realisable, because the original estimates of residual values and useful life remain accurate. Consequently giving effect to the impairment provisions in this case reduces the proximity of the distribution of earnings to the normal distribution and makes the time pattern of earnings more volatile than it would otherwise have been.

From a measurement of earnings perspective, impairment standards may be interpreted as imposing a requirement for accurate estimation. Inaccurate estimates of useful lives and residual values produce biased (until corrected) and more volatile estimates of long run profitability and distributions which are skewed and kurtotic. The evidence from these experiments suggests that revised estimates of useful lives and residual values implemented as required by the impairment standards produce, as long as they are more accu-

Table 9
Statistical best fits of experimental data to selected theoretical distributions

	Distribution	*Chi-square*	*K-S*	*K-S test result*	*Selected parameters*
Notes	**1**	**1**	**1**	**2**	**3**
S11	Gamma	40.89	0.01	Accept fit	$\lambda = 6.51835$
	Skew normal	70.62	0.02	Reject fit	$\alpha = 3.337921$
	Normal	758.92	0.05	Reject fit	$\mu = 4.91, \sigma = 2.55$
S12	Gamma	151.95	0.03	Reject fit	$\lambda = 7.54706$
	Skew normal	197.23	0.03	Reject fit	$\alpha = 3.097293$
	Normal	642.74	0.05	Reject fit	$\mu = 4.98, \sigma = 2.43$
S13	Gamma	54.54	0.01	Accept fit	$\lambda = 6.62652$
	Skew normal	94.72	0.01	Accept fit	$\alpha = 3.240039$
	Normal	717.82	0.05	Reject fit	$\mu = 4.97, \sigma = 2.52$
S11A	Gamma	33.58	0.01	Accept fit	$\lambda = 4.99693$
	Skew normal	66.19	0.01	Accept fit	$\alpha = 4.029764$
	Normal	962.91	0.06	Reject fit	$\mu = 9.99, \sigma = 5.33$
S11B	Gamma	107.75	0.03	Reject fit	$\lambda = 2.65857$
	Skew normal	90.61	0.05	Reject fit	$\alpha = 10.22953$
	Normal	1673.17	0.06	Reject fit	$\mu = 9.96, \sigma = 6.25$

Notes:

1. The parameters of the skew normal distribution are estimated using the statistical package R. The parameters of the Gamma and normal distributions and the goodness of fit tests of the latter are estimated using Crystal Ball. The chi-square and Kolmogorov-Smirnov goodness of fit tests of the Gamma and skew normal distributions use Dataplot.
2. The significance levels of the Kolmogorov-Smirnov tests vary between 1% and 10%.
3. λ is the shape parameter of the Gamma distribution, α the shape distribution of the skew normal and μ and σ are the mean and standard deviation, respectively, of the normal distribution.

rate than the original estimates, less volatile, skewed and kurtokic densities for earnings than are produced by earnings calculated ignoring the impairment provisions until final disposal. However, if the impairment provisions are applied in the absence of objective, statistical evidence relating to estimates of the realisable values and useful lives of assets, as in S11C, more volatile, skewed and kurtotic earnings distributions result.

The forms of the histograms of depreciated earnings produced by the impairment experiments show the same consistent pattern that was noted at the end of the previous section for all of the non-limiting distributional forms: being right skewed with positive kurtosis, reflected in peakedness and heavier than normal upper tails. The possibility of a non-normal distribution describing the experimental data better than the normal is explored by fitting the Gamma and skew normal distributions to the data from experiments S11, S11A, S11B, S12 and S13 and ranking these by their performance in terms of the Kolmogorov-Smirnov and chi-squared goodness of fit statistics in each experiment.[20]

The Gamma distribution used here, like the data, is right skewed with positive kurtosis. It is considered as being potentially appropriate in this context because of its association with random processes in time that are similar in important respects to processes that generate earnings, such as meteorological precipitation, output from storage systems and industrial accident costs (Johnson et al, 1995). The functional form of the Gamma for which results are reported is the general form, having location, scale and shape parameters. The chief interest is in the shape parameter, $\lambda > 0$, as the scale and location parameters merely alter the position and scale of the units on the abscissa. Lower values of λ are associated (in this case) with a higher degree of skewness to the right. The Gamma more closely approximates the normal as the value of λ increases.

Skew normal distributions are produced by a 'perturbation' of the standard normal distribution, usually by a distribution function. The form used here, due to Azzalini and Capitanio (1999), is as follows:

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[20] The Anderson Darling statistic was not available for the skew normal distribution and is therefore not reported for any of the distributions compared in Table 9. The skew *t* distribution was also fitted to the data but the results were virtually identical to those for the skew normal and are therefore also not reported.

$$f(x) = 2\phi(x) \cdot \Phi(\alpha x) \qquad (5)$$

where $\phi(x)$ is the standard normal density and $\Phi(\alpha x)$ is the Gaussian probability that x is less than αx. When the shape parameter α is zero, the density in (5) reduces to the standard normal (since $\Phi(0) = \frac{1}{2}$). As with the Gamma distribution, the shape parameter is again effectively an index of skewness but now the skewness to the right increases rather than decreases as α increases in value.

The results of the goodness of fit tests of the normal, Gamma and skew normal distributions are shown in Table 9. As might be expected, the two latter distributions give much improved fits to the data in all the experiments. It can be seen that both the value of λ and α behave in a consistent but inverse manner, reflecting in each experiment the degree of skewness in the data. The scale parameters for both Gamma and the skew normal are directly correlated across the experiments with the variance of the normal distribution and are therefore not shown. The fact that fitting the skew t distribution gives virtually identical results compared to the skew normal suggest that, at least in the case of the experimental data considered above, the appearance of heavy upper tails could be mainly due to comparing a right skewed distribution with the normal.

The Gamma distribution generally produces a superior performance in the goodness of fit tests. Both the Gamma and skew normal give flexibility in form fitting to allow modelling of skewness, although the domain of the Gamma only extends over a part of the real line. Interest lies in the genesis of these distributions and how the depreciated earnings measurement process might be responsible for generating random numbers obeying these probability laws. Given the propensity, for example, of the Gamma to tend towards the normal as λ gets larger, it may suggest a particular path for the convergence of earnings to the normal as activity levels increase. However, the positive kurtosis evident in most of the experimental results is overestimated by the kurtosis statistics implied by the fits of the Gamma distribution. In any event, further consideration of this issue and conjectures about the processes generating the relevant probability laws are left for later research.

10. Review and implications

10.1. Review

Basic results on some theoretical statistical properties of earnings numbers have been presented in this paper. Building on earlier theoretical work on the effect of the depreciation calculation on the variance of accounting earnings, this paper has investigated the statistical impact of depreciation type adjustments on the general distributional form of earnings. The general approach is experimental, using Monte Carlo methods and based upon Statistical Activity Cost Theory, which views depreciation type adjustments as a process of averaging costs over time. The results confirm previous research that such adjustments, when made on the basis of objective and accurate statistical estimates, reduce the time variance (volatility) of reported periodic earnings around long run profitability, thus improving the efficiency of earnings as a mean square error estimator of underlying profit. They show, in addition, that such accurate depreciation accelerates the progression of the earnings distribution towards a normal form. This adds another potentially useful reason for computing depreciation to improve the statistical properties of earnings, since being able to assume a normal distribution for earnings alleviates inferential problems in many different decision making contexts.

Under stationary economic conditions, the marginal distribution of the long-term activity segment of accounting earnings converges to approximate normality, as activity levels increase, whether a depreciation-type adjustment is applied or otherwise. However, depreciation accelerates convergence. At the lower levels of long-term activities more typical of that experienced in practice, the depreciation-type adjustment therefore plays a vital function. At these lower activity levels, in the absence of depreciation, marginal earnings distributions tend to assume various irregular forms, typically displaying multi-modality, strong asymmetry and in general, radical divergence from normal form. Addition of a depreciation adjustment in such circumstances typically induces a substantial transformation. The irregular features are attenuated and the entire distribution is consolidated, with a universal shift in the direction of a more normal form. Statistical fits to the experimental data suggest the possibility of exploring skewness in data generated at low activity levels, and its alleviation as activity levels increase, through distributions such as the Gamma and skew normal.

A particular issue investigated was the relevance of new information coming to light, in the form of revised estimates upon which the depreciation calculation is based. It was shown that, to better preserve desirable statistical properties for earnings, more accurate information should be impounded as soon as possible after it becomes available. This is consistent with the accounting treatment recommended in the impairment standards. However, such adjustments should only be made if based upon objective, verifiable evidence of changes in the parameters of depreciation type calculations, such as statistically reliable, revised estimates of useful lives and residual values.

10.2. Implications

The premise of the theory that underpins the results is that the numbers appearing in accounting reports are statistics based upon a process of measurement. Depreciation-type adjustments, as measurements, are not arbitrary so long as they are scientifically conceived and applied. The validity of this claim is demonstrated by modelling the procedures that accountants follow in preparing financial statements, formulating accounting earnings and depreciation type adjustments as mathematical models in the form of equations (1) – (3) and analysing them by standard statistical methods and criteria. The results produced by this approach to understanding accounting measurement have implications in financial reporting, management accounting and auditing, for issues such as the quality of earnings, risk measurement and analysis using accounting data and empirical research using accounting numbers.

In financial accounting and standard-setting, the analysis of the impairment provisions in IAS 36 (and similar national standards) in Section 9 illustrates the way in which Statistical Activity Cost Theory can be applied to assess the impact of specific recognition rules on the time series behaviour of accounting earnings. Its implications are that the impairment provisions impart improved statistical properties to earnings as long as they are implemented on the basis of accurate, objective evidence concerning the data on which depreciation calculations are based. However, they should not be implemented based upon subjective judgments that cannot be substantiated. This special case is indicative of the general applicability of statistical theory in providing methods for assessing the 'quality' of earnings, a matter of enduring concern to standard setting bodies.

Earnings quality can be defined in many ways. The particular interpretation relevant in this context is the ability of earnings to reflect underlying phenomena and, in particular, underlying values of income (e.g. Teets, 2002; Schipper and Vincent, 2003). The findings of this paper support the claim that depreciation-type adjustments improve the precision and statistical properties of reported earnings in estimating underlying, long run profitability. Investigation of the conditions under which this finding holds in general is as yet limited. However, the results so far obtained are consistent with this position and the method by which they can be checked for generality is defined by an effective procedure. Thus the results are open to replication by independent research.

The principle of accounting standard-setting that this point exemplifies is the desirability of supporting judgment, in making choices between alternative accounting policies, by adherence to objective, scientific methods of analysis. The approach taken in this paper illustrates the use of a mathematical model of an accounting calculation; a clearly defined parameter of interest to be estimated; and clearly stated statistical criteria for choice of best estimator. These are standard elements of statistical analysis. With this approach it is possible to obtain a categorical answer to virtually any question regarding which accounting number is best for a particular purpose, given the assumptions on which the analysis is based.

The results illustrate how it is possible to generate distributions of accounting numbers from the underlying processes that determine firm value. Using Statistical Activity Cost Theory this may be done on the basis of the three fundamental measurable attributes of activity costs, start times and duration times. The distributions thus generated represent the economic characteristics of the particular firm with those activity attributes and their quantiles therefore represent measurable risks specific to that firm. For example, the lower 95th percentile of an earnings distribution, estimated using actual data, is a measure of the risk that, 5% of the time, earnings will fall below the value defining the quantile. It is the 'earnings at risk' for a particular firm.

The application of this concept has far-reaching consequences. It provides a method, long advocated but otherwise not clearly defined, for producing 'confidence interval' financial reports, giving upper and lower limits for the confidence with which the values of items in financial statements can be asserted (e.g. Albrecht, 1976). The implications for risk assessment based upon publicly available financial reports are obvious, since users would be able to compare the extent of variability in accounting values and thus varying levels of 'risk' between different firms. In a management accounting context this kind of comparison is currently being made, at a finer level of detail and with access to information from plant maintenance systems, between different asset management policies, using a statistical activity cost analysis (Colin et al., 2006). In auditing, the estimation of distributions of accounting numbers offers the prospect of using analytic review procedures in additional substantive testing areas. Prior probabilities for earnings extending beyond specified quantiles, for example, could be determined from past audit data and used to focus attention on exceptional values in a manner, and with a precision, that is not currently possible.

Finally, the results reported in this paper have implications for empirical research using accounting numbers, especially capital market research. A

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[21] The degree of approximation may be gauged in various ways, e.g. using the Berry-Esseen theorem (see Feller, 1971:542–6).

typical assumption made in that literature is that ratios of accounting numbers including earnings are normally distributed. This is unlikely to be the case. If, for example, the accounting numbers used in a particular ratio calculation are both approximately normal[21] Hinkley's distribution (Hinkley, 1969) should give a reasonable sense of what the parameters and shape of the distribution of the ratio are likely to be and it may take a form markedly different from the normal. Marsaglia (1966) demonstrated the wide variety of forms the ratio of two normal distributions may take, including multi-modal forms. However, a fairly typical shape for such ratios is the often observed, highly peaked, long-tailed distributions noticed by empirical researchers. The analysis of the preceding section of this paper suggests an approach to investigating the genesis and therefore the theoretical form of distributions of ratios of accounting numbers.

These examples illustrate the wide import of the theory and results in this paper for the practice of accounting. Accounting is about measurement as well as disclosure. Scientifically based research into issues of how financial attributes should be best measured is as important to the development of the accounting discipline as are positive assessments of how providers and users may manipulate or misunderstand financial reports. Accounting research of the type reported in this paper can provide answers to questions such as 'Is this the best way to measure this financial statement item for this purpose?' The viewpoint that this question implies is that there are correct and incorrect ways to measure items in financial statements. The contrary viewpoint, that accounting calculations are essentially arbitrary, risks the consequential deduction that it is acceptable for management to manage accounting information to produce a subjective picture of what they believe firm value to be, encouraging creative accounting.

The following Appendix (p328) contains two types of graph:

1. A histogram showing the frequencies of earnings with a superimposed frequency curve for the Normal distribution. This gives an impression of the shape of the distribution of the experimental data.
2. A Q-Q plot consisting of ordered values of the data compared to the corresponding quantiles of a normal distribution. The latter is a straight line and the closer the experimental results are to this straight line, the closer the fit of the experimental results to the Normal distribution. The Q-Q plot gives an indication of the behaviour of observations in the tails of the distribution and of any outliers.

In (1) the y-axis measures frequencies while the x-axis measures the values of earnings generated by the relevant experiment. In (2) both axes measure earnings.

Appendix

Figure 1: S1 - Histogram of undepreciated earnings

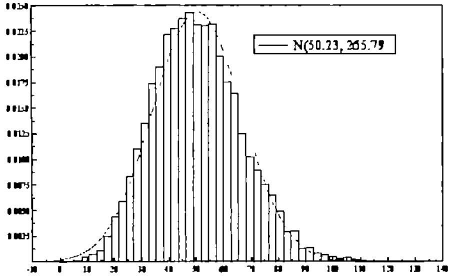


Figure 2: S1 - Histogram of depreciated earnings (Rational expectations)

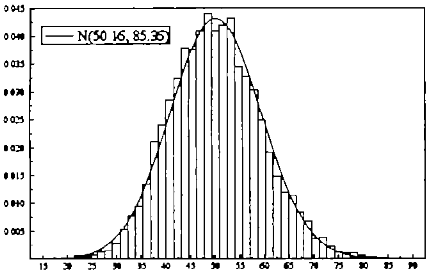


Figure 3: S2 - Histogram of undepreciated earnings

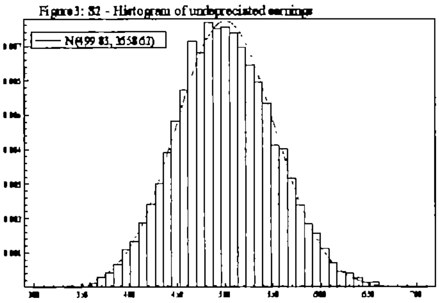


Figure 4: S2 - Histogram of depreciated earnings (Rational expectations)

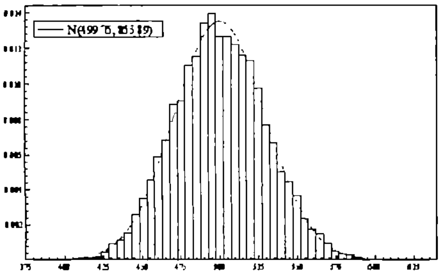


Figure 5: S2 - Distribution of undepreciated earnings

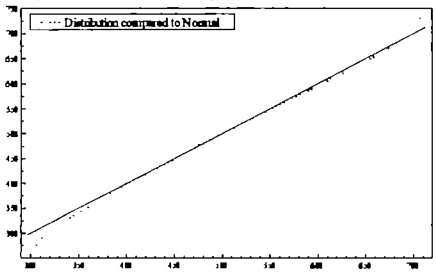


Figure 6: S2 - Distribution of depreciated earnings (Rational expectations)

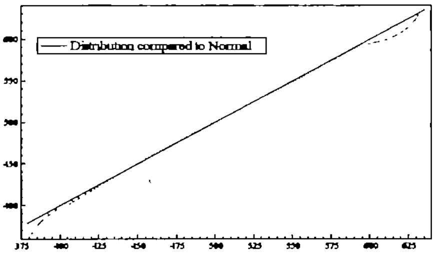


Figure 7: S3 - Histogram of undepreciated earnings

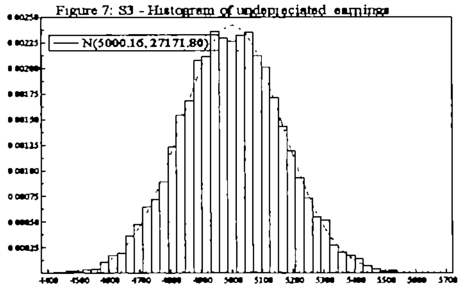


Figure 8: S3 - Distribution of undepreciated earnings

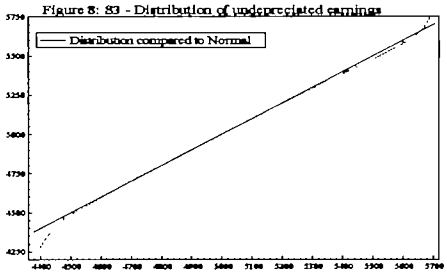


Figure 9. S3 - Histogram of depreciated earnings (Rational expectations)

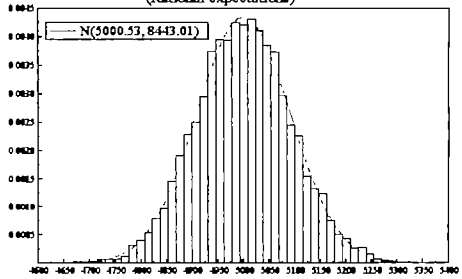
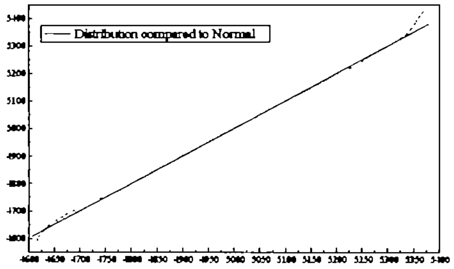


Figure 10: S3 - Distribution of undepreciated earnings (Rational expectations)



Appendix *(continued)*

Figure 11: S7 - Histogram of undepreciated earnings

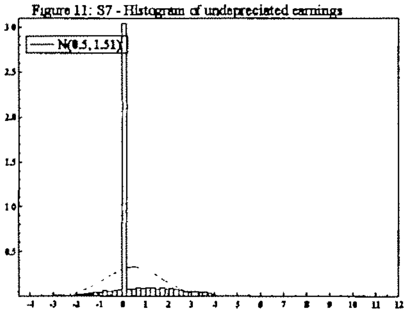


Figure 12. S7 - Histogram of depreciated earnings
(Random expectations)

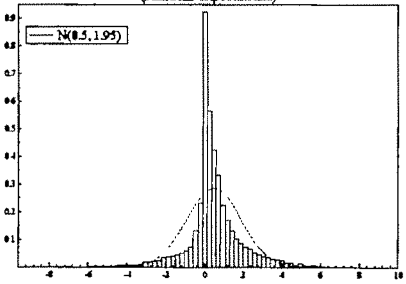


Figure 13: S7 - Histogram of depreciated earnings
(Rational expectations)

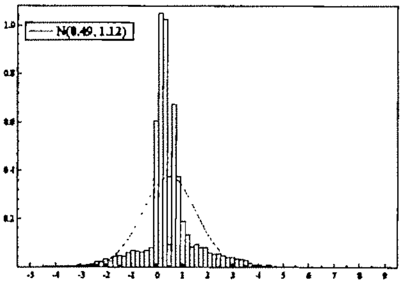


Figure 14: S7 - Histogram of depreciated earnings
(Accurate expectations)

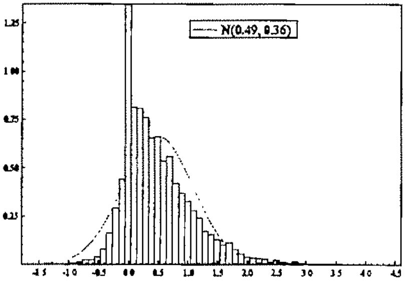


Figure 15: S7 - Distribution of undepreciated earnings

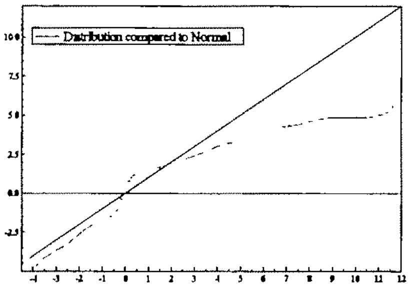


Figure 16: S7 - Distribution of depreciated earnings
(Random expectations)

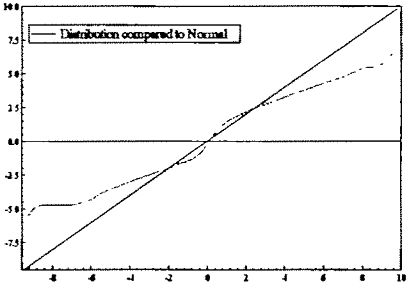


Figure 17: S7 - Distribution of depreciated earnings
(Rational expectations)

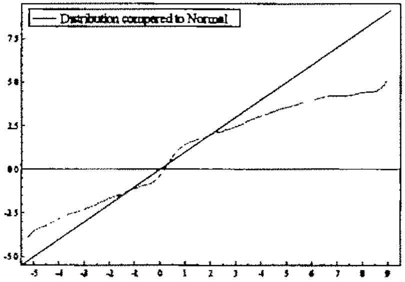


Figure 18: S7 - Distribution of depreciated earnings
(Accurate expectations)

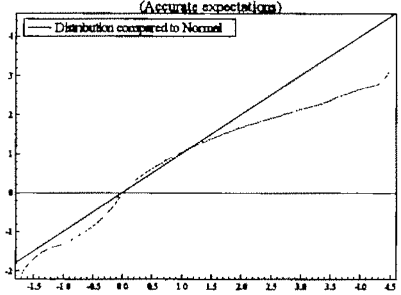


Figure 19. S8 - Histogram of undepreciated earnings

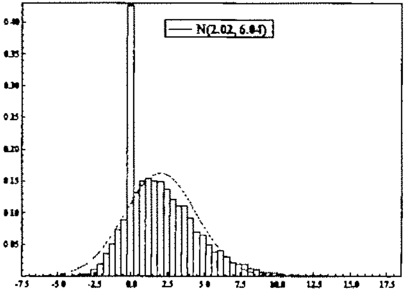
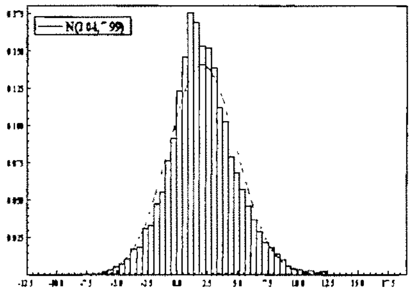


Figure 20: S8 - Histogram of depreciated earnings
(Random expectations)



Appendix *(continued).*

Figure 21: S8 - Histogram of depreciated earnings
(Rational expectations)

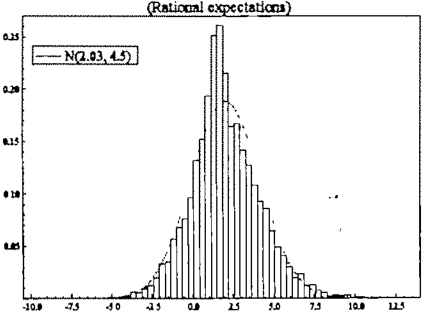


Figure 22: S8 - Histogram of depreciated earnings
(Accurate expectations)

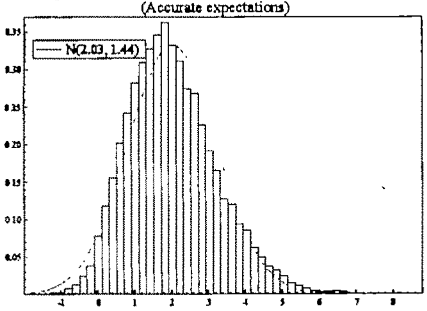


Figure 23: S8 - Distribution of undepreciated earnings

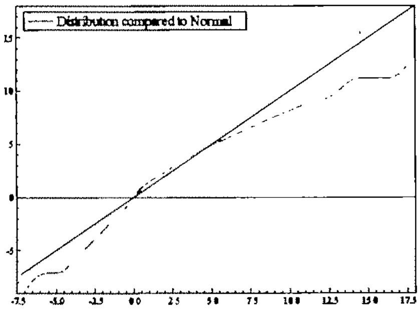


Figure 24: S8 - Distribution of depreciated earnings
(Random expectations)

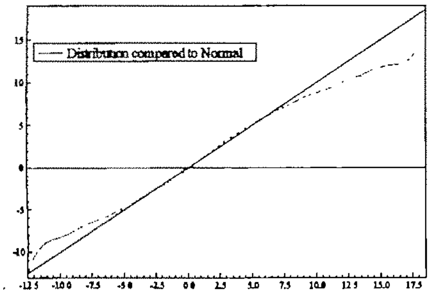


Figure 25: S8 - Distribution of depreciated earnings
(Rational expectations)

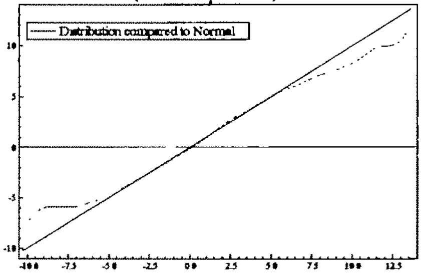


Figure 26. S8 - Distribution of depreciated earnings
(Accurate expectations)

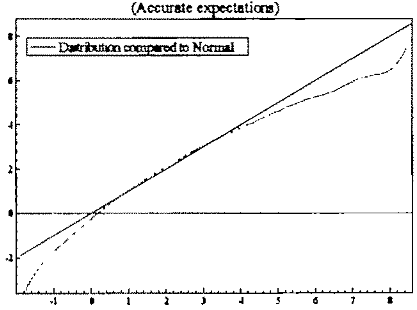


Figure 27: S9 - Histogram of undepreciated earnings

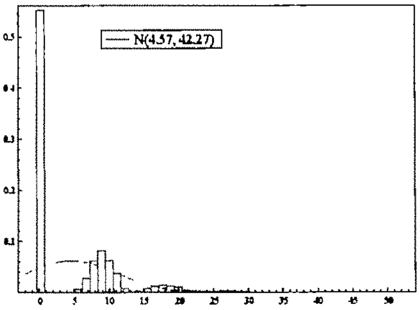


Figure 28: S9 - Histogram of depreciated earnings
(Random expectations)

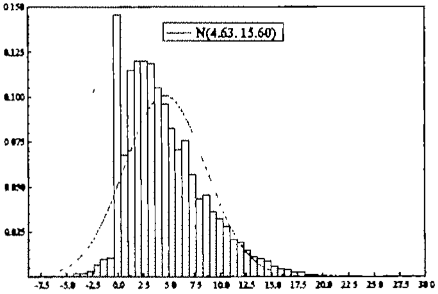


Figure 29. S9 - Histogram of depreciated earnings
(Rational expectations)

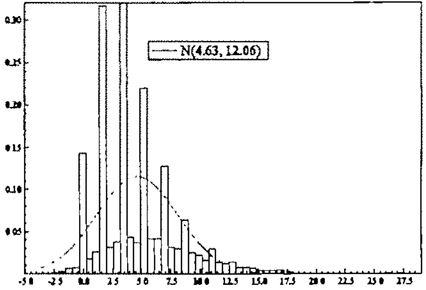
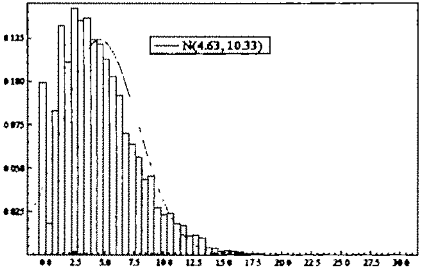


Figure 30. S9 - Histogram of depreciated earnings
(Accurate expectations)



Appendix *(continued)*

Figure 31: S9 - Distribution of undepreciated earnings

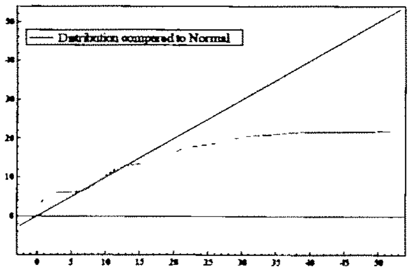


Figure 32: S9 - Distribution of depreciated earnings
(Random expectations)

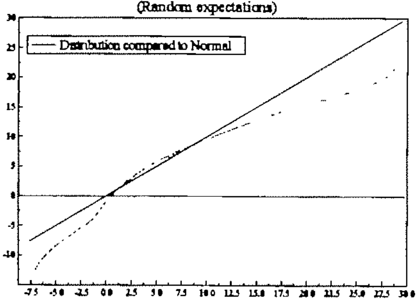


Figure 33. S9 - Distribution of depreciated earnings
(Rational expectations)

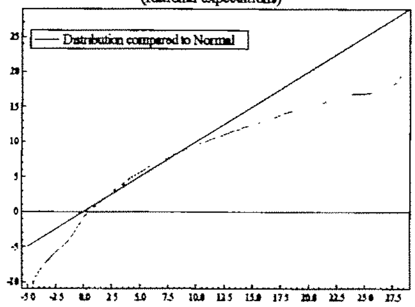


Figure 34: S9 - Distribution of depreciated earnings
(Accurate expectations)

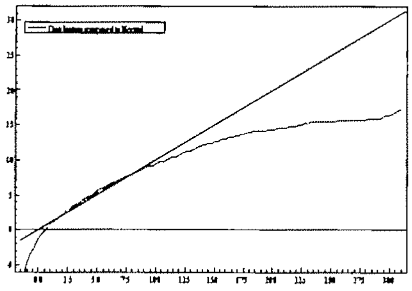


Figure 35: S10 - Histogram of undepreciated earnings

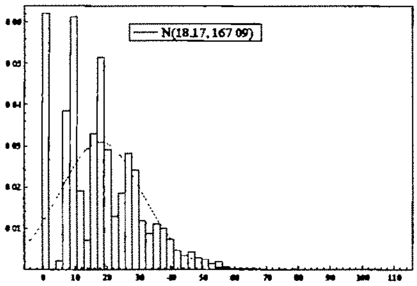


Figure 36: S10 - Histogram of depreciated earnings
(Random expectations)

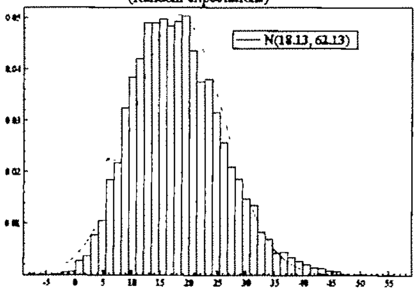


Figure 37: S10 - Histogram of depreciated earnings
(Rational expectations)

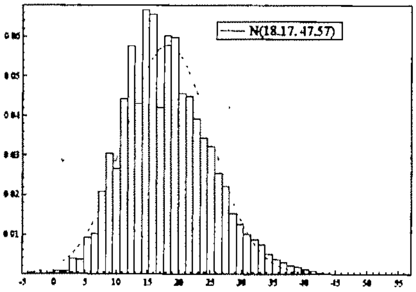


Figure 38: S10 - Histogram of depreciated earnings
(Accurate expectations)

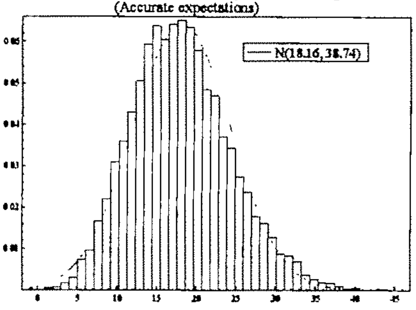


Figure 39: S10 - Distribution of undepreciated earnings

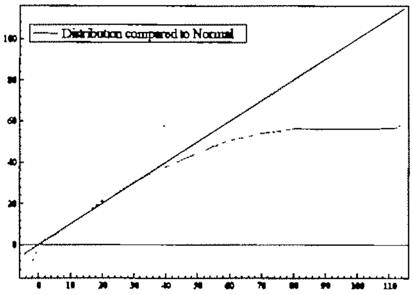
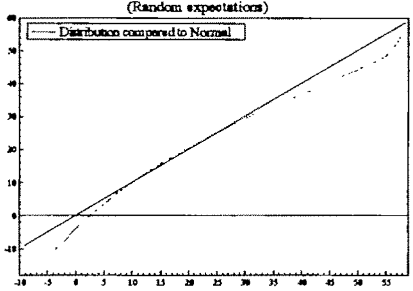


Figure 40: S10 - Distribution of depreciated earnings
(Random expectations)



Appendix *(continued)*

Figure 41: S10 - Distribution of depreciated earnings (Rational expectations)

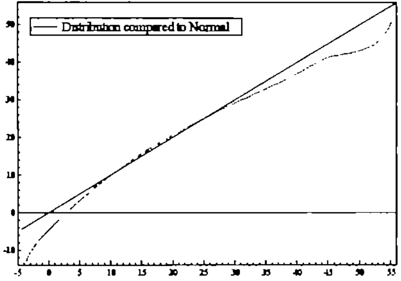


Figure 42: S10 - Distribution of depreciated earnings (Accurate expectations)

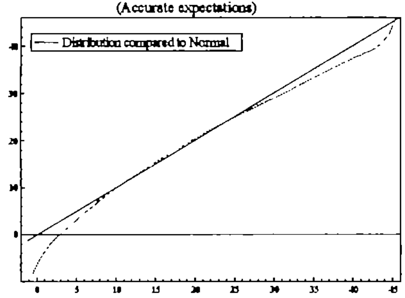


Figure 43. S11 - Histogram of undepreciated earnings

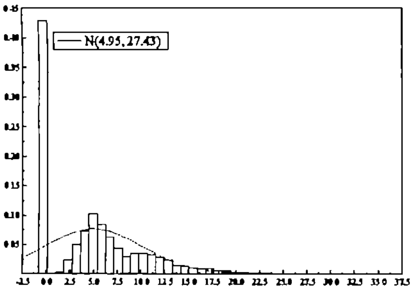


Figure 44: S11 - Histogram of depreciated earnings (Random expectations)

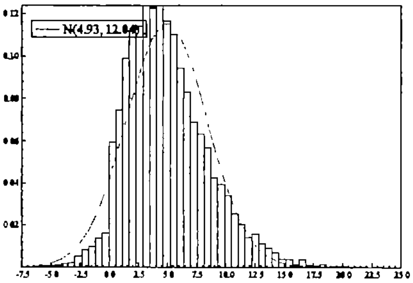


Figure 45: S11 - Histogram of depreciated earnings (Rational expectations)

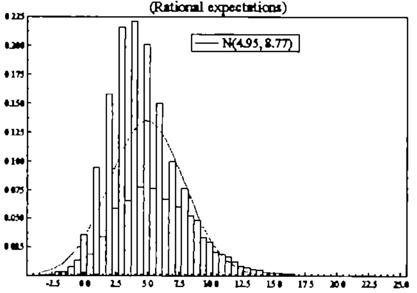


Figure 46. S11 - Histogram of depreciated earnings (Accurate expectations)

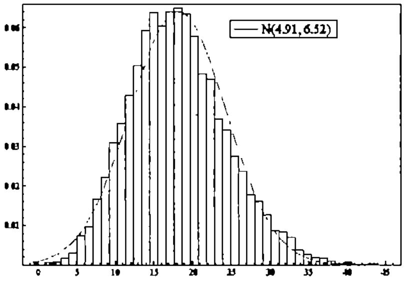


Figure 47 S11 - Distribution of undepreciated earnings

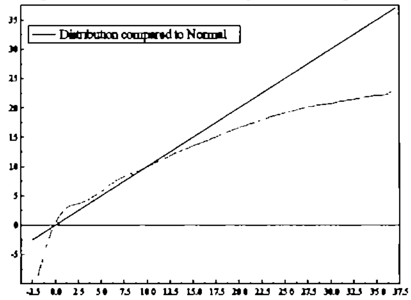


Figure 48: S11 - Distribution of depreciated earnings (Random expectations)

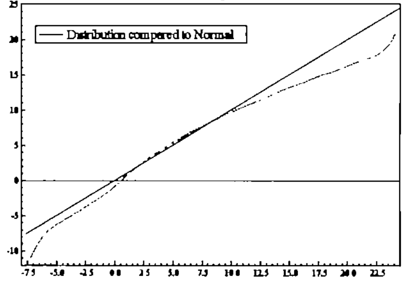


Figure 49. S11 - Distribution of depreciated earnings (Rational expectations)

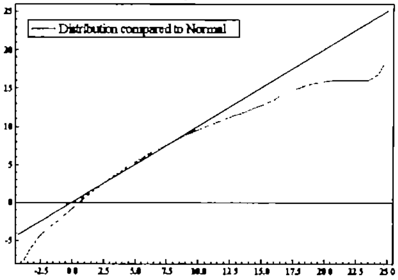
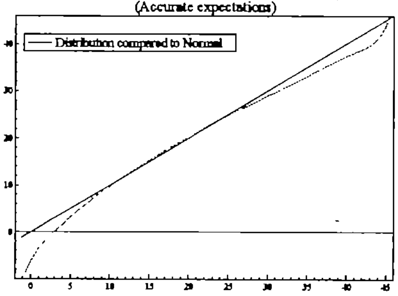


Figure 50: S11 - Distribution of depreciated earnings (Accurate expectations)



Appendix *(continued)*

Figure 51 S12 - Histogram of undepreciated earnings

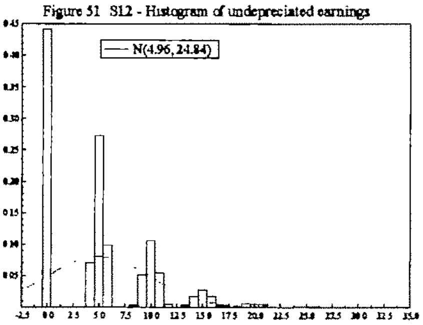


Figure 52: S12 - Histogram of depreciated earnings (Random expectations)

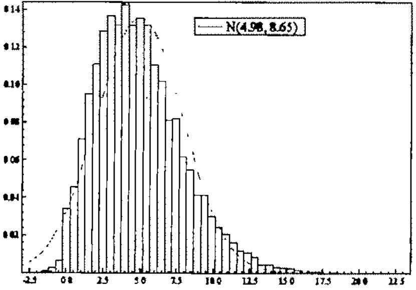


Figure 53: S12 - Histogram of depreciated earnings (Rational expectations)

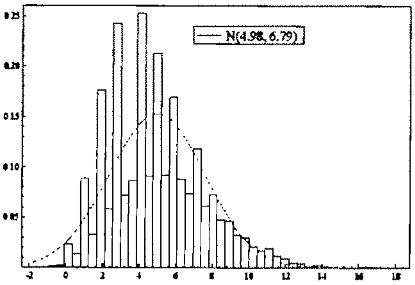


Figure 54. S12 - Histogram of depreciated earnings (Accurate expectations)

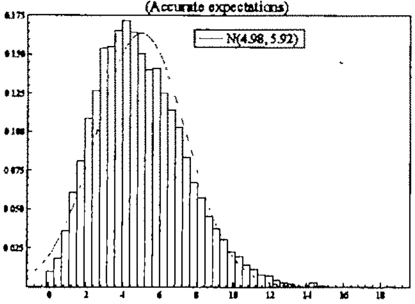


Figure 55: S12 - Distribution of undepreciated earnings

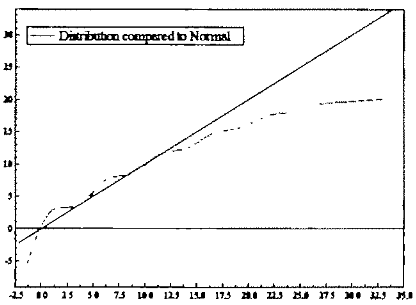


Figure 56: S12 - Distribution of depreciated earnings (Random expectations)

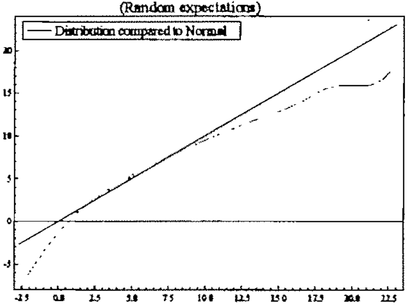


Figure 57: S12 - Distribution of depreciated earnings (Rational expectations)

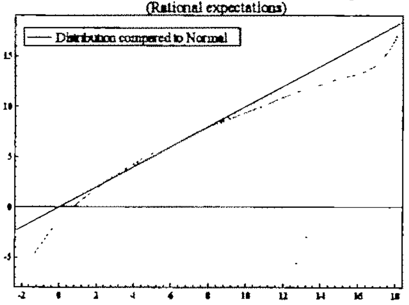


Figure 58: S12 - Distribution of depreciated earnings (Accurate expectations)

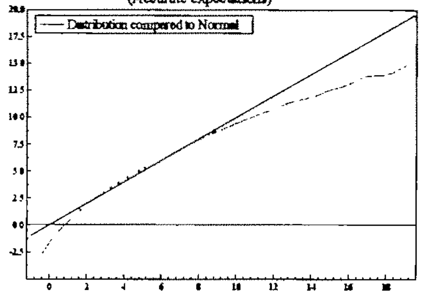


Figure 59: S13 - Histogram of undepreciated earnings

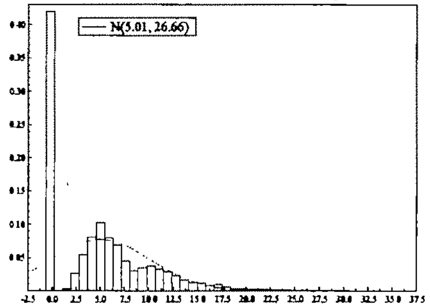
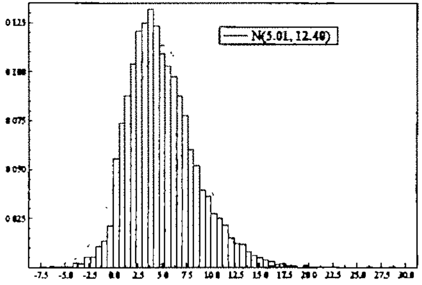


Figure 60: S13 - Histogram of depreciated earnings (Random expectations)



Appendix *(continued)*

Figure 61: S13 - Histogram of depreciated earnings (Rational expectations)

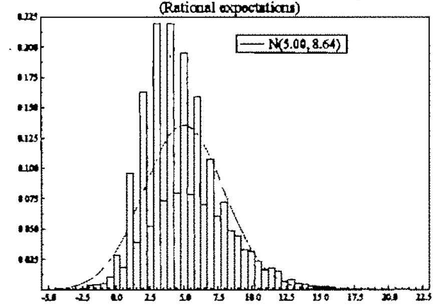


Figure 62: S13 - Histogram of depreciated earnings (Accurate expectations)

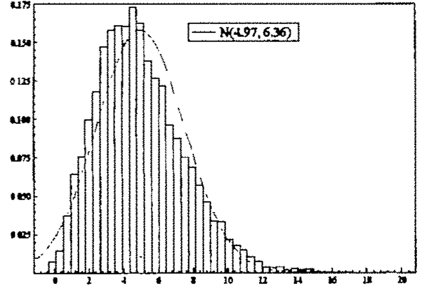


Figure 63: S13 - Distribution of undepreciated earnings

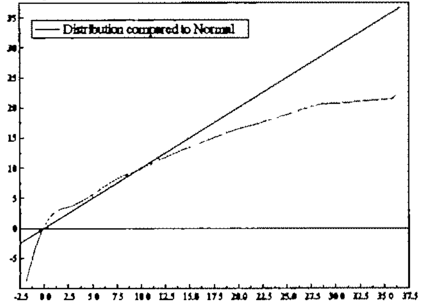


Figure 64: S13 - Distribution of depreciated earnings (Random expectations)

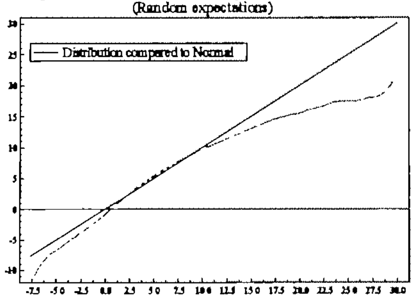


Figure 65: S13 - Distribution of depreciated earnings (Rational expectations)

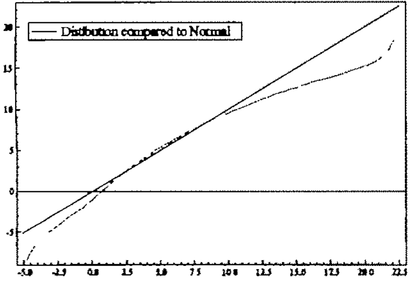


Figure 66: S13 - Distribution of depreciated earnings (Accurate expectations)

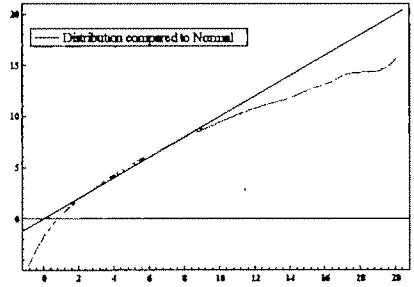


Figure 67. S11A - Histogram of depreciated earnings under impairment (Revised accurate expectations recognised)

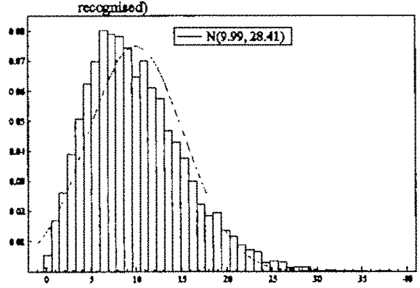


Figure 68: S11B - Histogram of depreciated earnings under impairment (Revised accurate expectations not recognised)

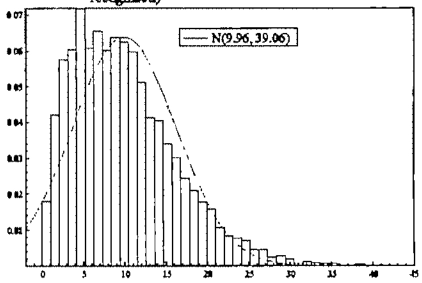
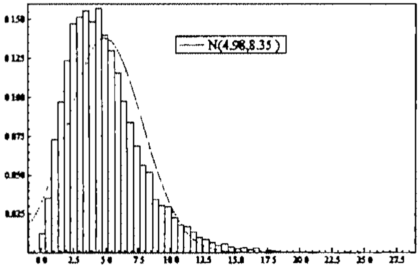


Figure 69. S11C - Histogram of depreciated earnings under impairment (Original estimates of residual value remain accurate)



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A research note

Fair value and executory contracts: moving the boundaries in international financial reporting

Peter Walton*

Abstract—The paper contributes to the research agenda of studies on accounting measurement by suggesting that incremental change is taking place in IFRS which has the effect of moving recognition of assets and liabilities to an earlier point in the transaction cycle. This is manifested in recognition of executory contracts and changes in economic state in some standards. The professional debate about fair value obscures the underlying boundary shift. Fair value is used to simulate completion of the transaction cycle. The use of fair value in this way is accompanied by a change in emphasis as to how reliability should be construed, with representational faithfulness being advanced over verifiability. The recognition of income and expense earlier in the cycle is corrected on final realisation, so the overall profits or losses of the entity are not changed, although recognition may take place in different periods than under historical cost.

1. Introduction

The question of the use of fair value in International Financial Reporting Standards (IFRS) has come to be a key issue in accounting debate. While the notion of using an external value for a transaction that has no observable cost is very far from new, constituents have previously reacted strongly to the use of fair value in the standards of the International Accounting Standards Committee (IASC) and the US Financial Accounting Standards Board (FASB) on accounting for financial instruments. The controversy over fair value was such that the IASC took 12 years to issue IAS 39 *Financial Instruments: Recognition and Measurement* and, once the European Commission adopted IFRS for European listed companies (Regulation CE 1606/2002), one of the key issues raised by constituents was that of fair value. For example, in 2003 French president Jacques Chirac wrote to Commission president Prodi[1] claiming that the use of fair value would destabilise the financial markets, probably the first time a national political office-holder has taken a position on a technical accounting question.

The issue remains in the forefront of debate about IFRS, partly as a result of convergence with US standards. Sir David Tweedie, chairman of the International Accounting Standards Board (IASB), when speaking in January 2006 to the Economic and Monetary Affairs Committee of the European Parliament, acknowledged this: 'Many of the issues of concern about the FASB-IASB joint work are based upon concerns about the possible extension of the use of fair value accounting in new standards.' (Tweedie, 2006:5). Writing about the announcement of the details of the FASB/IASB technical programme, Jopson (2006:18) wrote: 'As the first proposed changes trickle out, experts will be watching for two things guaranteed to raise the hackles: inappropriate use of fair value and overly prescriptive rules.'

Another indicator of constituents' perceptions is an article in *Global Eye on IFRS*, a monthly newsletter published by Ernst & Young. On page 2 of the January 2006 issue the lead article opens: 'The IASB is intent on introducing "fair value" as the primary basis for measuring amounts reported in financial statements'. The article goes on to argue that fair value means a market-based value, but that in practice such values are hard to observe: 'The practical reality is that no "level 1" or "level 2" (i.e. using market observations) valuation will be available for most assets and liabilities that will be required to be measured at fair value. Fair values will instead be determined by hypothesising what a market price would be if there were a mar-

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[1] Letter of 4 July 2003.

ket, very often based on management assumptions about the future, and using a management model.' The article goes on to say the use of fair values 'raises many questions about the reliability and understandability of the information'.

The FASB itself, in its exposure draft on fair value measurement (FASB, 2004: para. C2), says in the Basis for Conclusions that 'conceptually, fair value is a market-based measurement that is not affected by factors specific to a particular entity. Accordingly, it represents an unbiased measurement that is consistent from period to period and across entities.' The board acknowledges that concerns have been expressed about the reliability of fair value measurement but points out that it is aware that there are problems in its use, which is why it is used only in limited circumstances. The purpose of the exposure draft is to provide detailed guidance on making fair value estimates, with the intention of making estimates more reliable and more comparable (FASB, 2004: C3–C4).

The use of current values in financial reporting is also the focus of a good deal of research (e.g. Aboody et al., 1999, Barth et al., 1995) that sets out to test whether such information provides a better predictor of future share prices. Barker (2004) reviews the literature on value relevance and notes that research supports the notion that reporting changes in value of assets and liabilities increases the predictive ability of financial statements. Since 2005 many more companies have started to use IFRS in their financial statements, and there should be much more data available for analysis. An issue identified here is that the use of fair value in IFRS results not only in providing information about changes in values but also in recognising transactions earlier than is the case under historical cost.

This paper will argue that while the concern about fair value is undoubtedly very strong, the debate, as indicated above, focuses on two issues: whether fair value is more appropriate than historical cost as a measurement base, and whether it gives reliable measurement. The paper will argue that the use of fair value is not an end in itself; it is rather a means of achieving a different end, namely that of recognising transactions earlier in their cycle, an aspect that is largely ignored in debate. This has the effect of widening the view of the entity encapsulated in the financial statements. The paper will also argue that the move towards earlier recognition has been accompanied by a change in what is understood by reliability in financial statements, as the representation of economic phenomena is privileged over certainty of measurement. Finally, it will make the case that the concern about unreliability is perhaps overstated, to the extent that all transactions recognised ahead of realisation at fair value revert ultimately to historical cost. Earlier recognition may result in the reporting of fluctuations as the transaction is reported in real time, instead of being reported as history, only when the final outcome is known.

2. Earlier recognition in financial statements

Hines (1988) discusses the significance of recognition to the perception of what is the entity. Hines' master emphasised that recognition came with realisation of a transaction, and this was what determined the boundaries of the entity. What is being suggested in this paper is that fair value is used, notably in IAS 39, but also in IAS 41 *Agriculture* and IAS 37 *Provisions, Contingent Liabilities and Contingent Assets*, to simulate the realisation of a transaction and cause recognition earlier in the transaction cycle – thus moving the boundaries of the entity as represented in the financial statements, or moving more things to within Hines' fence.

Contingent theories of accounting change (as for example set out in Haller and Walton, 2003: 3/4) suggest that there is a cycle in financial reporting where a state of equilibrium, in which preparers and users are satisfied that the existing rules convey sufficiently accurate signals for the market to function, continues until it is broken by new information suggesting that in practice some information that is necessary for the market is not being captured. This often occurs as a financial scandal becomes public, notoriously as in the case of Enron, which was followed by the Sarbanes-Oxley Act and a revision of accounting rules for special purpose entities.

An earlier example of a shift in circumstances is the growth in the use of derivatives and futures contracts to manage currency and interest rate exposures and sometimes commodity prices. The rapid rise in this kind of economic activity brought about a situation where companies (and sometimes municipalities) were engaged in contracts whose outcomes were uncertain and which were largely unrepresented in the balance sheet, because they were incomplete transactions which escaped the measurement model. As Pacter (1998:23) notes: 'Traditional accounting principles simply do not cope very well with these new kinds of financial instruments and today's types of transactions in them.'

The traditional accounting model largely ignores executory contracts,[2] except in the context of accounting for long-term contracts, even though some accounting theory texts (e.g. Hendriksen, 1982: 72–3) have long recognised that in many cases economic activity is gradual, while accepting that the practicality of reliable measurement militated against recognising that in accounting. The problems with financial instruments highlighted the fact that the executory contract has potential value for the business and challenged accounting to move its boundaries to acknowledge this. IAS 39 was part of the regulatory response to the non-disclosure of executory contracts that had potentially a great significance for the financial situation of an entity (Cairns et al., 2002:364), and the excessive time taken to reach agreement can be seen as reluctance to move the long-established boundaries of reporting.

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[2] The term 'executory contract' is used to mean a legally binding contract which is still in the course of execution.

International standards started to move in the last decade towards recognising the potential significance of incomplete transactions. In 1990, the IASC's Draft Statement of Principles on financial instruments proposed that operating financial assets and financial liabilities should be recognised at fair value (Cairns et al., 2002:365). IAS 37, finalised in 1998, has the notion of an onerous contract ('the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received from it': para.10), and represents a first step towards bringing executory contracts within the boundaries of financial reporting. The scope of IAS 37 excludes contracts for financial instruments (dealt with under IAS 39 *Financial Instruments: Recognition and Measurement*) and all executory contracts other than onerous ones. IAS 37 reflects the prudent bias of the traditional model, recognising executory contracts as significant but addressing only those that are liabilities and not those that are assets. IAS 39, also first published as a standard in 1998, goes much further, however, by recognising both assets and liabilities that arise from executory contracts that are financial instruments.

One issue common to both IAS 37 and IAS 39 is that there could be negative (or positive) changes in the value of the entity, arising from executory contracts, and which were not recognised at all, because there was no completed transaction with a measurable cost to cause them to cross the traditional recognition threshold. To an extent this could also be said about the subject of IAS 41. Once again the standard-setters were addressing an issue where value changes took place on a continuous basis – the growth of biological assets (crops and animals) – often with no measurable initial cash transaction to cause them to be recognised, or, if there were a cash transaction, with no subsequent acknowledgement of significant value changes.

Into this last category also came investment properties, the subject of IAS 40. These would have an initial historical cost and would therefore be recognised within the boundaries of the entity, but they are held partly to make holding gains, which are only recognised on disposal under a historical cost approach. IAS 40 allows the option of recognising value changes on a year-by-year basis.

The recognition boundaries of international standards have been moving in the last decade. Existing standards have already crossed into the area of recognising assets and liabilities arising from executory contracts and reinforced the idea of recognising changes in assets and liabilities that do not arise from completed transactions. Some of the work being done on revenue recognition by the respective staffs of the FASB and IASB extends the movement into this area. While only at the discussion stage, staff analysis so far[3] is based on recognising assets and liabilities, rather than completed transactions. In practice this means examining all non-cancellable executory contracts from the time the contract is signed, to determine whether there are assets and liabilities. The analysis suggests that, once a non-cancellable contract exists, there is a liability (known as the 'performance obligation') and a right to receive consideration. This project is still at the stage of analysis and no decisions have been taken, at the time of writing, but the staff analysis demonstrates an interest in the idea of recognising that economically significant elements exist before the transaction is completed.

The FASB fair value exposure draft (FASB, 2004) defines fair value as 'the price at which an asset or liability could be exchanged in a current transaction between knowledgeable unrelated parties' (para. 4). It says that the objective of fair value measurement is 'to estimate an exchange price for the asset or liability being measured in the absence of an actual transaction' (para. 5). It is interesting that the language used emphasises the idea of simulating a transaction, even though this aspect is not developed further in that document.

The contention set out here is that the recognition of a transaction earlier in its cycle, by simulating a realisation, enlarges the scope of what is recognised in financial statements, and thereby expands the boundaries of the statements from that previously accepted.

3. Reliability in IFRS

The second issue is a possible shift in what standard-setters consider reliability to mean in terms of measurement in financial statements and how this may impact on what is recognised in financial statements. The IASB *Framework for the Preparation and Presentation of Financial Statements* says that to be recognised, assets and liabilities must be capable of being measured with sufficient reliability. But recent standards and the discussion that has accompanied them suggest that the standard-setter's notion of reliability is somewhat different from that of the wider constituency of accountants.

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[3] Project information from IASB website, up to date as at 9 December 2005, consulted 7 March 2006

The European Financial Reporting Advisory Group (EFRAG) has drawn attention to this difference. In a letter to the IASB discussing measurement issues, Stig Enevoldsen, chairman of EFRAG's Technical Expert Group, writes:

> 'Although "reliability" has always been described in the Frameworks as something that is more complex than the dictionary definition of "reliability", that is not how most commentators have tended to use the term; in their view the term is about how "soft" and subjective the information is.'[4]

The IASB *Framework for the Preparation and Presentation of Financial Statements* (para. 31) says 'information has the quality of reliability when it is free from material error and bias and can be depended upon by users to represent faithfully'. This can be seen in IFRS 2 *Share-based Payment* that requires that a share option is expensed, based on its value at grant date. The value of the option in a listed company can only be measured by observation in the market at vesting date, or by the completed transaction when the option is exercised. Employee share options cannot be traded, so there is no observable market price before vesting date. The standard says that entities should use a valuation technique 'consistent with generally accepted valuation methodologies for pricing financial instruments' (para.17).

In the *Basis for Conclusions*, the standard (BC296) says: 'Accounting often involves making estimates, and therefore reporting an estimated fair value is not objectionable merely because that amount represents an estimate rather than a precise measure'. The Basis also emphasises (BC300) that in the board's view, 'representational faithfulness' was just as important as being 'free from material error', and indicates that entities needed to take account of a trade-off between the two qualities. This suggests a shifting of the balance between representation of an economic phenomenon, and certainty of measurement.

More recently, the IASB and FASB issued a joint discussion paper on the qualitative characteristics of financial reporting in July 2006. *Preliminary Views on an improved Conceptual Framework for Financial Reporting: The Objective of Financial Reporting and the Qualitative Characteristics of Decision-useful Financial Reporting Information* says that the qualitative characteristics are relevance, faithful representation, comparability and understandability (para. QC7). It is proposed to abandon reliability as an identified characteristic and replace it with faithful representation.

A second example concerns the tentative decision, put forward in the 2005 exposure draft of amendments to IAS 37, to abandon the notion of contingent assets and liabilities and recognise rights and obligations on a probability-weighted basis. Under IAS 37, contingent assets and liabilities have to be disclosed but not recognised. They are possible rights and obligations whose existence will be confirmed by a future event not wholly within the control of the enterprise (para.10). If the event is 'probable' (more likely to happen than not in IASB usage), a liability is recognised. Probability is the threshold criterion, acting as an on-off switch: once past the threshold, the contingent nature has disappeared and the whole amount is recognised.

The analysis in the exposure draft (*Amendments to IAS 37 Provisions, Contingent Liabilities and Contingent Assets and IAS 19 Employee Benefits*, issued on 30 June 2005) and also discussed in Rees (2006) is that contingent assets and liabilities are usually a combination of an unconditional right or obligation and a conditional right or obligation. For example, when being sued for damages, an entity has (a) the unconditional obligation to pursue the case, and (b) the conditional obligation to pay damages, depending upon the court's decision. The two taken together are a contingent liability in IAS 37 if the probability of having to pay damages is higher than 50% and a disclosure of the full amount of the claim would be made. However, under its new analysis, the board considers that the unconditional obligation fulfils the definition of a liability and so should potentially be recognised, while the conditional obligation does not meet the definition. Nevertheless, the probability of the conditional obligation crystallising should be used in measuring the unconditional obligation over the whole range of values. So if an entity reckons it has a 10% chance of having €50,000 damages awarded against it, it should recognise a liability of €5,000. Under this approach probability ceases to be a threshold and becomes part of a variable measurement scale. The use of probabilities to calculate outcomes has been taught as a management decision tool for decades, but is now appearing in accounting measurement.

Many accountants are likely to think that this redefinition changes what they had understood by reliability in financial reporting. The IASB *Framework for the Preparation and Presentation of Financial Statements* notes (para.83) that assets and liabilities can be recognised only when they

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[4] Letter to Sir David Tweedie, dated 23 February 2006, appendix paragraph 1(b)(i), published on EFRAG website (www.efrag.org)

'can be measured with reliability'. If reliability means, as Enevoldsen suggests, verifiability, it is difficult to see how a 10% chance of success is verifiable. Commentators on the exposure draft (analysed in the IASB Observer Notes for the February 2006 meeting of the board, para. 92) note that lawsuits typically have a binary outcome and also that estimating the outcome is particularly difficult.

4. Consequences of early recognition

Recognition earlier in the cycle is much criticised by banks and insurance companies (and indirectly by Jacques Chirac, the French president, in his letter cited above) for creating instability in financial statements. The argument seems to be that where there is a long-term transaction (for example a life assurance policy) the important issue is the final settlement values. Recognising parts of the transaction ahead of final settlement is no guide to the final outcome.

A draft framework for financial reporting issued by the CFA Institute takes a different view (CFA, 2005:12):

> 'Opponents of fair value reporting argue that measuring and recognizing assets and liabilities at fair value in the financial statements introduces volatility into the financial statements. We argue to the contrary: if fair value measurement results in greater volatility, then the measurement has merely unmasked the true economic reality that was already there. One of the most important evaluations investors must make is to ascertain the degree of risk to which an investment is exposed: the greater the volatility, the greater the risk. The risk is then weighed against the investment's expected returns. Reporting methods that mask true volatility do a great disservice to investors, impair their ability to make well-founded investment decisions, and can result in inefficient allocations of capital.'

When IAS 21 *The Effects of Changes in Foreign Exchange Rates* was introduced in 1983, there was some concern that unsettled financial assets and financial liabilities denominated in a foreign currency had to be converted using the closing rate (i.e. to be measured at fair value at balance sheet date), and this could give rise to artificial fluctuations as unrealised gains and losses were passed through the income statement. The counter argument was that the spot rate at the balance sheet date was the best available estimate of the settlement rate (e.g. Wallace and Ogle, 1983: 5). Put another way, the spot rate at any given moment impounds all the available knowledge about the future market rate.

Preparers have subsequently appeared to accept this approach. At least measurement of outstanding balances of financial instruments denominated in a foreign currency does not appear on IASB analyses of topics of concern to preparers, nor in the current professional literature. However, the foreign currency example does demonstrate that although fluctuations which reflect market movements are incorporated into the annual profit, when the outstanding financial instrument is settled, the net gain or loss is finally crystallised. From this it is clear that reporting incomplete transactions by simulating completion at interim stages has the effect of reporting value changes during the life of the transaction but does not change the net profit or loss in aggregate on the transaction. Value changes are reported period by period, rather than only in the settlement period, and the transaction is 'trued-up' at settlement.

Barker (2004) argues that investors are better informed as a result of reflecting value changes. He advocates a matrix income statement that distinguishes between initial measurement and subsequent changes. The implication is that if volatility is present but clearly identified, analysts will not be misled.

By way of a historical experience of using fair value, French accounting has long had the notion of recognising changes in economic value in general, both in terms of impairment, through the annual *inventaire*[5] and through the possible revaluation of assets. Richard (2004) points out that fair value was used in France for individual assets in manufacturing entities the 19th century. He says that it was thought appropriate to use conservative valuation techniques because of the fragility of the businesses. Factories were not amortised, they were valued at the re-sale price at each balance sheet date, leading to massive write-offs immediately the asset came into service.[6] He argues that management preferred this kind of approach because it had a beneficial effect on cash flows by restricting payment of dividends until after the asset had paid back the initial investment. However, he notes that investors were less enthusiastic about the dividend effect, and that pressure from this source, eventually reinforced by the introduction of income tax at the beginning of the 20th century, led to the current model of financial reporting which assumes a going concern and amortises assets over their estimated future lives. This approach causes costs to be spread evenly, allowing a steady flow of dividends to shareholders and taxes to the government.

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[5] The Savary Ordonnance of 1673 brought in the notion of the business making an annual inventory of assets and liabilities at current values, and this has remained in French law as a test of balance sheet values.

[6] Use of fair value can as easily lead to deflated values as inflated ones.

5. Conclusion

This paper has attempted to draw attention to apparently neglected issues underlying standard-setters' use of fair value. It is suggested that the problem for the standard setter is that the existence of executory contracts may have a significant impact on the value of the company. Fair value is being used in recent international standards to measure the effect of an executory contract by recognising a transaction ahead of completion of that transaction. Its use in this way has the effect of changing the view of the entity that is presented in the financial statements. Using Hines' metaphor, the fence that marks the reported view of the organisation is being moved to encompass some transactions while they are still in process. To the extent that the reporting rules define perceptions of the entity, such a change will give a different view of the entity and may recognise volatility. There is potential for research interest in designing experiments to capture the effect of such volatility.

This paper suggests that this change in the boundaries has been accompanied by a change in what is understood by reliability in accounting measurement: the FASB and IASB are giving more emphasis to representational faithfulness, and less to measurement certainty. They appear to be saying that some representation of what is taking place economically, even if its measurement is estimated and uncertain, is better than deferring recognition until a transaction is completed.

It should be noted, notwithstanding, that this approach is analogous with the treatment of unsettled financial items denominated in a foreign currency, which is not regarded as controversial, and that these incomplete transactions are finally recorded at their settlement figure. The effect of simulating earlier completion of the transaction is to recognise gains and losses earlier than would otherwise have been the case, and may therefore induce volatility, which the analysts and standard-setters argue was already there but was not acknowledged. The lifetime profit or loss on the transaction is not changed.

A significant issue for research design may be that people are accustomed to financial statements presenting settled transactions, with no uncertainty. They may not want uncertainty brought into financial statements by representing transactions at successive stages in their life cycle. Philip Roth (2004), in his novel, *The Plot Against America*, mentions the relationship between history and the future:

> 'The unfolding of the unforeseen was everything. Turned wrong way round, the relentless unforeseen was what we schoolchildren studied as 'history' – harmless history, where everything unforeseen in its own time is chronicled on the page as inevitable. The terror of the unforeseen is what the science of history hides, turning disaster into an epic.'

While Roth is talking about more dramatic events, some of the emotion generated by fair value and recognition of incomplete transactions may be explained as deriving from the expansion of the reporting boundary, moving from a comfortable history of the transaction, viewed from after realisation, to looking at how the transaction unfolds.

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IASB publications

International Financial Reporting Standards are available on the website of the International Accounting Standards Board, www.iasb.org, and in a bound volume, currently *2006 International Financial Reporting Standards (Bound Volume)*. The following list refers to the extant version of each standard at the time of writing the paper.

Framework for the Preparation and Presentation of Financial Statements.

IAS 21 *Effects of changes in foreign exchange rates*.

IAS 37 *Provisions, Contingent Liabilities, and Contingent Assets*.

IAS 39 *Financial Instruments: Recognition and Measurement.*
IAS 40 *Investment Property.*
IAS 41 *Agriculture.*
IFRS 2 *Share-based Payment.*
Amendments to IAS 37 Provisions, Contingent Liabilities and Contingent Assets and IAS 19 Employee Benefits June 2005.
Preliminary Views on an improved Conceptual Framework for Financial Reporting: The Objective of Financial Reporting and the Qualitative Characteristics of Decision-useful Financial Reporting Information July 2006.

FASB publications

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Fair Value Measurements Proposed Statement of Financial Accounting Standards, June 2004 Norwalk, Conn. USA: Financial Accounting Standards Board.

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A ranking of accounting research output in the European region: a correction

Kam C. Chan, Carl R. Chen and Louis T.W. Cheng*

Correction:
Chan, K.C., Chen, C.R. and Cheng, L.T.W. (2006). 'A ranking of accounting research output in the European region'. *Accounting and Business Research*, 36 (1): 3–17.

EDITORIAL NOTE

It has been drawn to the attention of the editor and the authors that there were errors in Table 3 and Appendix 2 of the paper Chan et al. (2006). There were two sources of error: changes of institutional name that were not identified by the researchers and the Anglicisation of some institutional names in English language journals causing the appearance of a different name from that of the native language in the computer analysis. The authors have re-examined their data in the light of comments from various quarters and have recalculated the weighted and unweighted numbers of articles. The corrected rankings, with the weighted and unweighted numbers of articles, are published below. The most significant consequences for relative ranking relate to the Helsinki School of Economics and the University of Maastricht. In the case of the Helsinki School of Economics, the entries previous ranked as 25 and 68 are now combined to produce a ranking of 21. In the case of the University of Maastricht (formerly know as the University of Limburg at Maastricht), the entries previously ranked as 44 and 55 are now combined to produce a ranking of 23. There are further corrections to the weighted and unweighted numbers of articles for the University of Valencia, University College Cork, the University of Gothenburg and the University of Ghent. There are also corrections for geographical inaccuracies in the original tables.

The authors have apologised for the errors and oversights and I appreciate the care they have taken in checking their data again. I would also like to thank Willem Buijink, Juha Kinnunen, Frank Moers, Nicolas Mottis and Peter Walton for their helpful guidance in pointing out aspects requiring correction.

The responses to the paper have indicated a passionate awareness in Europe of the importance of making a wider audience aware of the range of research activity taking place across the continent and it seems likely that we will see analyses in future that are not constrained by the boundaries of the English language.

Pauline Weetman, editor

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Table 3 (corrected)
Ranking of European universities by weighted number of articles in 19 leading accounting journals

This Table provides a ranking of European universities by weighted articles in 19 accounting journals during the period of 1991–2002. The weights are by co-authorship and co-affiliations. The number of unweighted articles as well as the country of the universities are also presented.

Rank	*Institutions*	*Country*	*Weighted number of articles*	*Unweighted number of articles*
1	U Manchester	UK	63.65	129
2	London School Economics	UK	55.58	78
3	U Edinburgh	UK	50.42	78
4	Cardiff U	UK	47.25	99
5	U Dundee	UK	31.72	70
6	Lancaster U	UK	31.50	56
7	U Glasgow	UK	29.53	52
8	U Essex	UK	27.90	49
9	U Exeter	UK	24.67	44
10	U Warwick	UK	23.25	39
11	U Manchester Institute Science & Tech	UK	23.23	46
12	U Sheffield	UK	22.82	49
13	U Strathclyde	UK	20.78	43
14	U Cambridge	UK	20.67	30
15	Copenhagen Business School	Denmark	20.25	35
16	U Wales-Aberystwyth	UK	18.25	34
17	U Reading	UK	18.17	24
18	U Stirling	UK	17.62	39
19	U Bristol	UK	17.17	26
20	U Leeds	UK	16.33	31
21	Helsinki School Economics	Finland	16.33	29
22	U Southampton	UK	14.83	24
23	U Maastricht	Netherlands	13.79	31
24	U Cyprus	Cyprus	12.92	22
25	U Nottingham	UK	11.83	17
26	U Vaasa	Finland	11.75	21

The correction for Appendix 2 is as follows:

Appendix 2 (corrected)
European universities that are ranked from 27 to 100 in research output

This Table provides a ranking of European universities from 19 accounting journals in 1991–2002. The weights are by co-authorship and co-affiliations. Rankings are based on number of weighted articles published with total number of articles as the tie-breaker. The weights are by co-authorship and affiliation.

27	Norwegian School Economics and BA	Norway	10.75	16
28	Oxford U	UK	10.67	16
29	U London	UK	10.40	22
30	Turku School Economics and BA	Finland	10.33	19
31	Catholic U Leuven	Belgium	9.50	20
32	U West England	UK	9.37	20
33	U Newcastle-upon-Tyne	UK	9.17	14
34	U de Valencia-Spain	Spain	9.08	15
35	Cass Business School, City U	UK	8.83	14
36	U Aberdeen	UK	8.83	12
37	U Wales-Bangor	UK	8.67	15
38	Johann Wolfgang Goethe-U	Germany	8.33	14
39	Open U	UK	8.25	11
40	U Birmingham	UK	7.83	15
41	U Bath	UK	7.67	13
42	U East Anglia	UK	7.67	12
43	Loughborough U	UK	7.67	11
44	Sheffield Hallam U	UK	7.60	16
45	U Groningen	Netherlands	7.58	15
46	Stockholm School Economics	Sweden	7.50	8
47	U Carlos III de Madrid	Spain	7.37	17
48	U Bradford	UK	7.37	16
49	Heriot-Watt U-Edinburgh	UK	7.12	18
50	U Hull	UK	6.75	11
51	U Antwerp	Belgium	6.67	17
52	Erasmus U Rotterdam	Netherlands	6.53	9
53 (tied)	U College Cork	Ireland	6.33	11
53 (tied)	London Business School	UK	6.33	11
55	HEC	France	6.33	10
56	U College Dublin	Ireland	6.33	9
57	Vrije U Amsterdam	Netherlands	6.17	8
58	U Portsmouth	UK	6.00	15
59	Dublin City U	Ireland	6.00	11
60	Athens U Economics and Business	Greece	6.00	9
61	Aston U	UK	5.97	12
62	U York	UK	5.50	6
63	INSEAD	France	5.36	12
64	Stockholm U	Sweden	5.33	11
65	U Ulster	UK	5.33	8
66	Queen's U-Belfast	UK	5.00	9
67 (tied)	U Amsterdam	Netherlands	5.00	7
67 (tied)	U Graz	Austria	5.00	7
67 (tied)	U Gothenburg	Sweden	5.00	7
70	U Zaragoza	Spain	4.90	12
71	U Ghent	Belgium	4.50	11
72	U Jyvaskyla	Finland	4.50	6
73	U Paris-Dauphine	France	4.50	5
74	ESC-Paris	France	4.25	8
75	Glasgow Caledonian U	UK	4.20	10
76	Odense U	Denmark	4.00	8
77	U Plymouth	UK	4.00	4
78	U Pompeu Fabra	Spain	3.92	6
79	U Southern Denmark	Denmark	3.50	7

Appendix 2 (corrected) *continued*
European universities that are ranked from 27 to 100 in research output

80	U Paisley	UK	3.50	6
81	U Lodz	Poland	3.50	5
82	U Geneva	Switzerland	3.50	4
83	Thames Valley U	UK	3.42	8
84	Tilburg U	Netherlands	3.42	6
85	U Tampere	Finland	3.25	8
86	Middlesex U	UK	3.25	7
87	U Aarhus	Denmark	3.17	5
88	U Augsburg	Germany	3.00	5
89	Eindhoven U Technology	Netherlands	2.75	6
90	U East London	UK	2.70	6
91 (tied)	Napier U-Edinburgh	UK	2.67	6
91 (tied)	U Huddersfield	UK	2.67	6
93 (tied)	Royal Institute Technology-Stockholm	Sweden	2.50	3
93 (tied)	U Zurich	Switzerland	2.50	3
95	U Pablo de Olavide de Sevilla	Spain	2.33	10
96	ESSEC	France	2.33	3
97	U Liverpool	UK	2.00	4
98 (tied)	Bodo Graduate School Business	Norway	2.00	3
98 (tied)	Swedish School Economics and BA	Sweden	2.00	3
98 (tied)	U Ca Foscari di Venezia	Italy	2.00	3

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Book Review

Accounting Standards: true or false? *R. Anthony Rayman*. London: Routledge, 2006. x + 23pp. £19.99.

In this book, Anthony Rayman seeks to show that: (a) financial accounting standard-setters are barking up the wrong tree in their attempts to lay down accounting standards that are conducive to presenting a 'true and fair view' based on the conventional financial accounting model; and (b) a model based on the 'separation of funds and value' (i.e. of a statement of *ex post* funds flows and a statement showing an *ex ante* 'planned investment rate') provides the only way via the latter statement of presenting a 'true and fair reflection' of *financial performance*. (The former statement, presumably with an historical cost balance sheet, is intended to satisfy the need for *stewardship* accounting.) According to Rayman, the conventional model that seeks to serve the purposes of both stewardship and performance measurement confuses two incompatible objectives. His argument is based on the following:

- the 'Kaldor criterion', viz. that 'the main purpose of accounting is to exhibit, for the proprietors of the business, the actual results in terms as nearly comparable as can be to the expected results ... [so as to] make it possible for the proprietors to judge whether the business ... fulfils those expectations in the light of which they invested their capital, and which they alone are capable of deciding' (Kaldor, 1955, quoted on p.4 of the book and elsewhere);
- a critique of the conventional financial accounting model from the perspective of *performance measurement* which, following A. L., Thomas's two 'Studies in Accounting Research' (Thomas, 1969, 1972), might be called 'The Allocation Problem Part 3'. Rayman shows that *even if asset (and liability) values are not an issue*, the model cannot report periodic rates of return on investment that are a fair reflection of the underlying rate of return of the firm unless the volume of activity remains constant;
- a critique of conventional investment appraisal techniques on the grounds that they use cash flows to the firm rather than cash flows to the investor to calculate Net Present Value or the Internal Rate of Return;
- an extension of the above two critiques to what he considers to be the failures of corporate governance under 'managerial capitalism';
- the presentation of his segregated model, followed by a discussion of the implications for accountability and audit, the 'expectation gap' and the conceptual framework.

In his introduction to *The Allocation Problem: Part II* (Thomas, 1972), A. L. Thomas likens himself to Prince Golaud in Maurice Maeterlinck's *Pelléas et Mélisande*, when he becomes lost in the forest when hunting, and compares the conventional financial accounting model to the animal Golaud was hunting, quoting the words Maeterlinck gives to Golaud: 'God knows where that beast has led me. I thought I had killed it, and here I see traces of blood.' (Thomas quotes the original French.) Indeed, the conventional financial accounting model has shown remarkable resistance to attacks on a priori grounds. Mattessich (1964), in another literary allusion, compared it to the Russian general Kutuzov in Leo Tolstoy's *War and Peace*, who, while unable to defeat Napoleon (the Russian winter did that), provided the Russian people with 'a mighty bulwark against chaos' that enabled it to stand firm against the invader. For Mattessich, the conventional accounting model, with all its shortcomings, provides such a bulwark in our economic dealings.

To what extent, then, can Rayman be said to have succeeded where others have failed? Since about the mid-1970s, aprioristic critiques of the conventional financial accounting model and proposals for alternative models (such as Rayman, 1969 and Sorter, 1969) have been out of fashion. Following the publication by the AAA of its *Statement of Accounting Theory and Theory Acceptance* (AAA 1977), if not before, academic accountants (in the English-speaking world, at least) started to lose interest in issues of normative accounting theory which, for lack of empirical grounding, were perceived to be irresolvable. Following Beaver (1968) and Ball and Brown (1968), they increasingly turned to empirical issues of the production and use of financial accounting information, for which purpose hypotheses derived from microeconomics were developed and tested with the intent of developing a body of theory which would be explanatory and predictive of financial accounting phenomena but not normative

– the so-called 'positive accounting theory' of Watts and Zimmerman (1986) which may, however, be 'conditionally normative' (Mattessich, 1995 ch.11; Archer, 1998).

Accounting standard-setters, however, continued their search for a 'conceptual framework' throughout the 1970s, and are indeed still at it (the IASB and the FASB are currently working on the development of a common conceptual framework for the two bodies). One of the main preoccupations of the IASB has been *asset and liability measurement*. This may have led Rayman (in the light of his demonstration that *asset values are irrelevant* to the inability of the conventional financial accounting model to provide a fair reflection of the underlying rate of return on investment in a multi-period setting with a changing periodic volume of activity) to believe that the time was ripe to mount another attack on the conventional model, and to blow the dust off his 1969 'separation of funds and value' model in the hope that this time it might gain acceptance. He appears to have received encouragement from some people who consider with scepticism the IASB's commitment to promoting the use of 'fair values' in financial reporting.

While there is little that is new in Rayman's critique of the conventional financial accounting model, his analysis of its shortcomings may miss some key points that are relevant to the pertinence of his proposals. In fact, his argument raises two main questions:

1. How reasonable and realistic is his use of the 'Kaldor criterion'?
2. Even if his use of the criterion is reasonable and realistic, how viable is his proposed alternative model for financial reporting?

As regards the first question, one may start by responding with another question and a remark: (a) how could any but the simplest of businesses have a *single* 'planned investment rate'? (b) to evaluate a rate of return, one needs information about the associated risk; Rayman nowhere discusses the latter. Whether Rayman (who shows much nostalgia for the work of the pioneers of financial economics such as Fisher) recognises it or not, financial economics has moved on since Kaldor put forward his 'criterion' in 1955 (in the context of a proposal for an expenditure tax). However, I have the impression that Rayman does not accept the implications of Portfolio Theory and its development into Capital Market Theory, largely because he does not appear to appreciate the relevance of risk in considering returns or the significance of the Capital Market Line in this context (see his critique of the concept of the cost of capital, p.119).

One may tend to agree with Rayman, however, regarding the excessive nature of the claims made by financial accounting standard-setters for the information contained or potentially contained in conventional financial reports, and the associated 'expectation gap'. One of the implications of the critiques that were made in the 1960s and 1970s is that '*general purpose* financial statements' cannot present 'finished information', but rather provide a 'semi-finished product'. The fundamental reason for this was given by Mattessich (1972), namely the need to 'articulate the required information purpose' in order to be able to produce information as provided within an *information system* – see also Most (1982) on the problems of 'general purpose' financial statements. Thus, since the general purpose financial statements of the conventional model cannot meet the requirements of an information system, they are best thought of as providing *semi-finished information*. The task of producing a more finished product belongs to information intermediaries such as financial analysts who are likely to know for what purpose the product is to be used. Conventional financial reports and the accompanying notes provide a wealth of such semi-finished information, which can give (or fail to give) a 'true and fair view' in the sense of *not being misleading*, but which neither represents any objective reality (Alexander and Archer, 2003) nor meets well any *specific* information purpose. This being the case, the 'hybrid' nature of such information, reflecting a conflation of 'stewardship' and 'performance measurement' that is criticised by Rayman as reflecting a confusion of incompatible objectives, is not so fundamentally problematic as he would have us believe.

Point (b) above is also relevant to the second question, since Rayman's model does not require any information about risk. His 'value accounts' provide management's estimate of a period's *ex ante* rate of return corrected in the light of the previous period's outturn. But a business of any size and complexity can hardly have a *single* planned rate of return; rather, it will seek to achieve rates of return on its various activities that exceed minimum rates that are appropriate given the degrees of risk. Thus it is not clear how Rayman's model, or anything like it, could be used even for supplementary information in a management report, let alone as a replacement for conventional statements of income and changes in equity. As a possible component of a management report, the model needs to be tested and, if possible, refined by being applied in practice. Given that one can jettison an existing model, however deficient, instead of trying to improve it, *only* if one has a better model, I believe that Rayman should have devoted more space to demonstrating the applicability of his model in practice rather than dwelling at such length on the shortcomings of the existing model.

The book is written as a polemic and the style of writing, with the repeated rhetorical use of the 'Kaldor criterion', reflects this. Here it is worth noting something odd about the title of the book: *Accounting Standards: true or false?* Can an *accounting standard* be *true or false*? Accounting standards are *norms* or *rules*, and as such do not have truth values; instead, they may be valid or invalid (Raz, 1979; Archer, 1993). To ask whether accounting standards are true or false is therefore a piece of sloppy thinking. What Rayman seems to mean is: are existing accounting standards conducive to truthful financial reporting?

Insofar as financial accounting standard-setters adopt a Correspondence Theory of Truth and an External Realist view of the objects with which financial reporting is concerned, they may set themselves unrealistic (and ill-informed) targets and produce misleading conceptual frameworks which do little to remove the 'expectation gap' (Alexander and Archer, loc. cit.; Archer, 1997). But to put forward such a critique is to make a very different one from that of Rayman.

An important question concerning any book, whether one agrees or not with its argument, is: Is it a good read? I quite enjoyed Rayman's book. To a large extent, for me it was a 'trip down memory lane' of debates that were already coming to an end, but which much exercised me, in my early years as an academic. His polemical style is stimulating and irritating by turns. For what readership is the book primarily intended: practitioners, academics, or students? Rayman's predilection for highly simplified arithmetical examples to illustrate his points is likely to irritate academics, for whom much of the argument in the book will presumably not be new, and also practitioners who deal with financial reporting issues in all their complexity. So maybe the main potential beneficiaries will be students; the book can provide plenty of topics for discussion in undergraduate seminars. In that capacity, good luck to it and its author.

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